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DEPARTMENT OF THE ARMY TECHNICAL MANUAL

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OPERATOR, ORGANIZATIONAL, DS, GS, AND DEPOT
MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOL LISTS)

CALORIMETER DA-272/FRC-39A(V);
DA-358/FRC-39A(V) 7, AND DA-385/MRC-85(V) 2;
DUMMY LOAD, ELECTRICAL DA-319/MRC-98;
AND DUMMY LOAD TYPE 957A
(RADIO ENGINEERING LABORATORIES TYPES 957,
957G, 957D, 957B, AND 957A)



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WARNING

**DANGEROUS VOLTAGES
EXIST IN THIS EQUIPMENT**

Be careful when working on the 120/208-volt ac line connections.

DON'T TAKE CHANCES!

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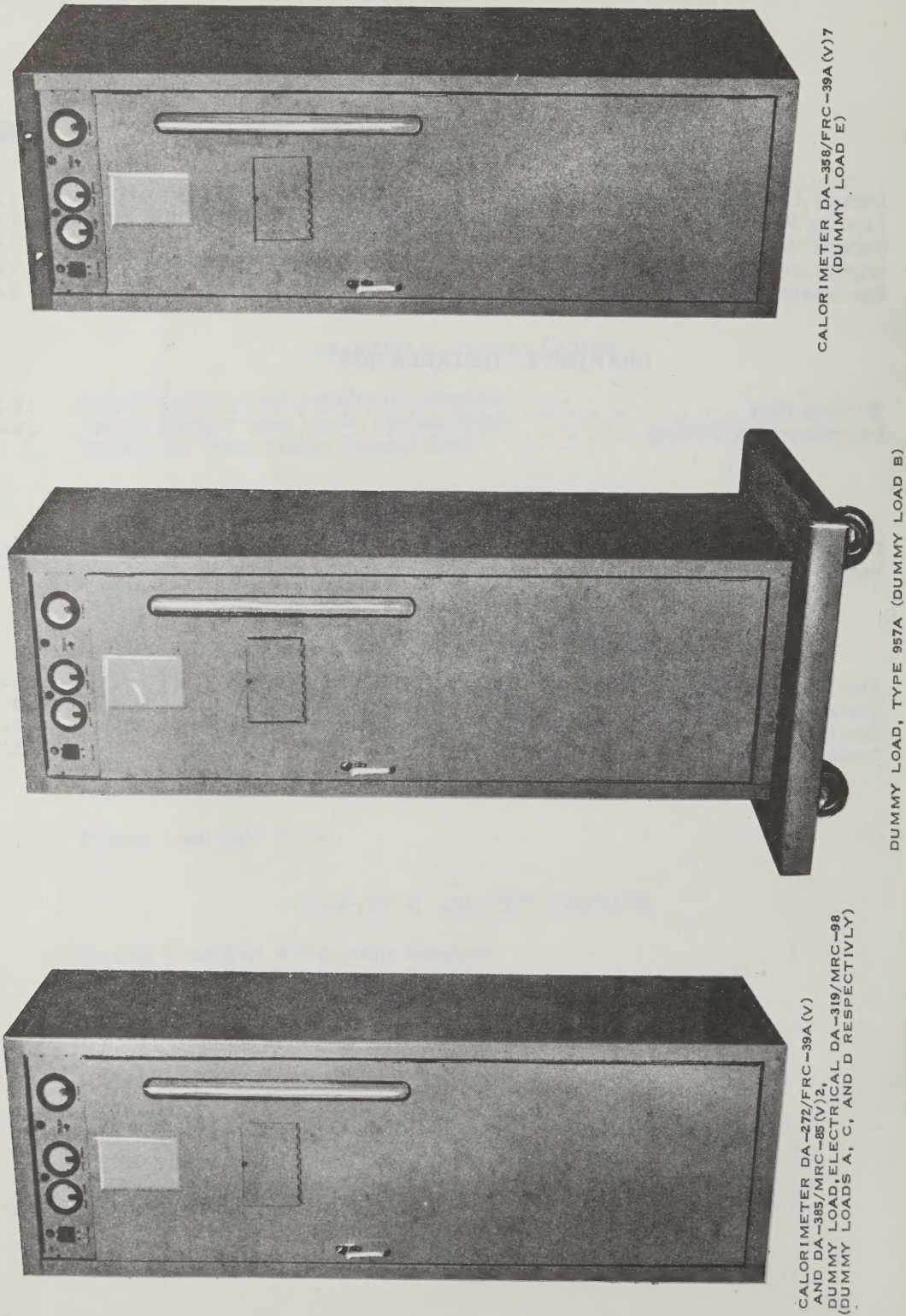


Figure 1-1. Calorimeter DA-272/FRC-39A(V), DA-358/FRC-39A(V)7, and DA-385/MRC-85(V)2;
Dummy Load, Electrical DA-319/MRC-98; and Dummy Load Type 957A

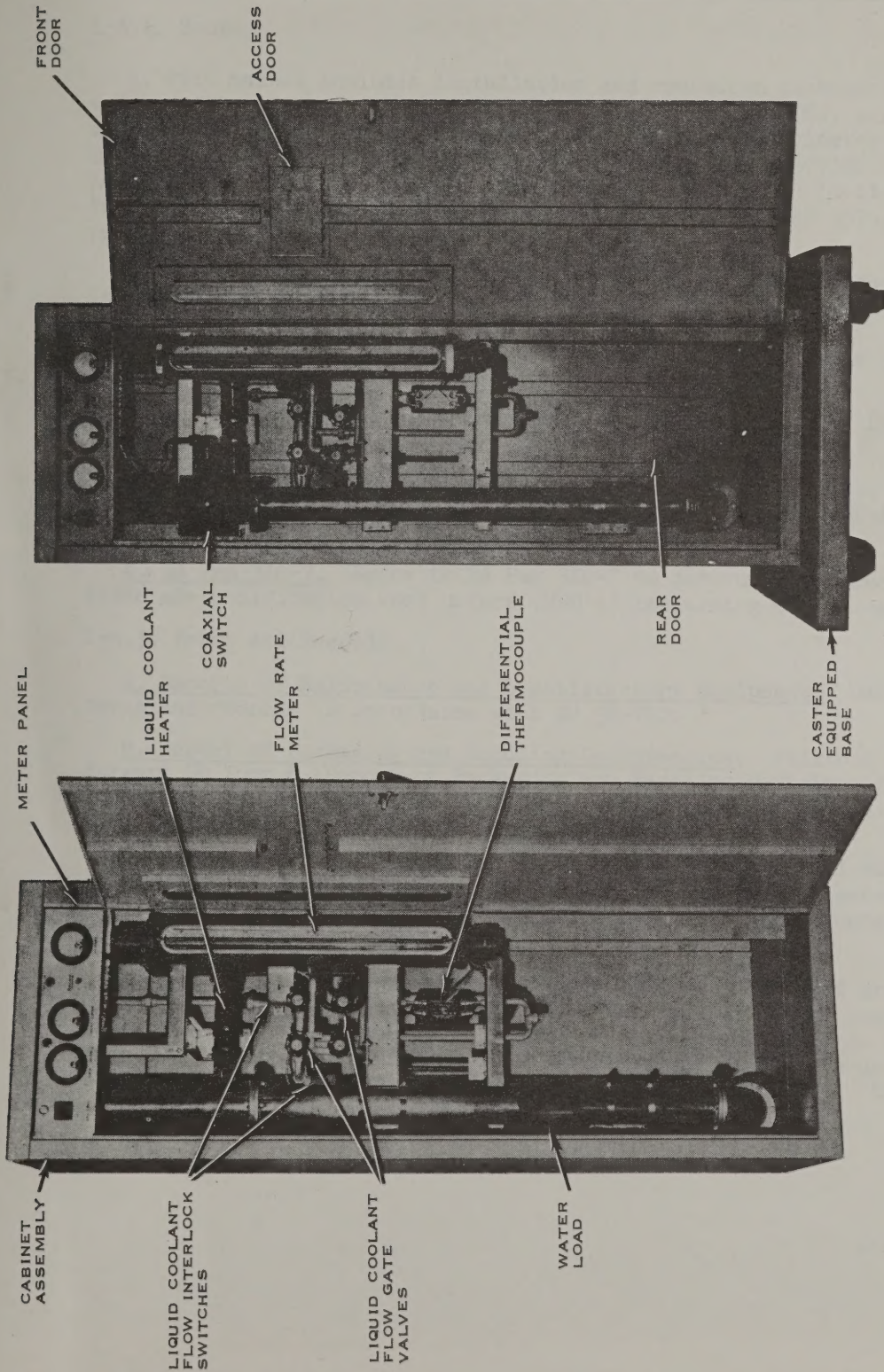



Figure 1-2. Dummy Load Assemblies



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CHAPTER 1

GENERAL INFORMATION

1-A.1. Scope

a. This manual includes installation and operation instructions and covers operator's, organizational, direct support (DS), general support (GS), and depot maintenance. It describes Calorimeter DA-272/FRC-39A(V), DA-358/FRC-39A(V)7, and DA-385/MRC-85(V)2; Dummy Load, Electrical DA-319/MRC-98; and Dummy Load Type 957A (Radio Engineering Laboratories Types 957, 957G, 957D, 957B, and 957A, respectively).

b. A basic issue items list (BIIL) for this equipment appears in appendix A, a maintenance allocation chart (MAC) appears in appendix B, an organizational repair parts list and a direct support, general support, and depot repair parts list appear in appendix C.

Note: Appendixes A, B, and C are current as of 14 May 1968.

1-A.2. Index of Equipment Publications

a. DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

1-A.3. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Use equipment forms and records in accordance with TM 38-750.

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Report of Packaging and Handling Deficiencies) as prescribed in AR 700-58 (Army), NAVSUP Publications 378 (Navy), AFR 71-4 (Air Force), and MCO P4610.5 (Marine Corps).

c. Discrepancy in Shipment Report (DISREP) (SF361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF361) as prescribed in AR 55-38 (Army), NAVSUP Pub 459 (Navy); AFM 75-34 (Air Force), and MCO P4610-19 (Marine Corps).

d. Reporting of Equipment Manual Improvements. Report of errors, omissions, and recommendations for improving this manual by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to DA Publications) and forwarded direct to Commanding General, U. S. Army Electronics Command, ATTN: AMSEL-ME-NMP-AD, Fort Monmouth, New Jersey 07703.

1-1. DESCRIPTION AND PURPOSE.

1-2. DESCRIPTION.

1-3. The dummy load (fig. 1-1) is a self-contained flow type calorimeter unit (fig. 1-2), consisting of a meter panel, flow rate meter, differential thermocouple, liquid coolant flow interlock switches, liquid coolant heater, water load, liquid coolant flow gate valves, plumbing, and cabinet assembly; dummy loads A and B contain a coaxial switch and have front and rear cabinet doors; dummy load B is mounted on a base equipped with casters; dummy load E has two indicator lamps (fig. 1-1) at the top front of the cabinet assembly and uses 3 coaxial switches.

1-4. Except for the coaxial switches, all electrical operating controls are located on the meter panel of the dummy load.

1-5. The liquid coolant flow gate valves and the coaxial switch (dummy loads A and B) are located behind the access door (fig. 1-2), except on dummy load E which has the 3 coaxial switches externally mounted in the rf transmission lines running from the power amplifiers to the dummy load.

1-6. All liquid coolant, ac power, and interlock connections are made through the top of the dummy load cabinet assembly. On dummy loads A, B, C, and E the rf power is routed through the top of the dummy load cabinet assembly; the rf power is routed through the back of the cabinet assembly on dummy load D.

1-7. PURPOSE.

1-8. The dummy load provides a means of dissipating and measuring the rf output power from either 10-kw power amplifier #1 or #2 (fig. 1-3) of a radio set. Heat exchanger #1 or #2, depending upon which power amplifier is being used, provides a valve controlled liquid coolant flow to the dummy load.

1-9. The dummy load uses a 2-kw power emission with a 1 gallon per minute liquid coolant flow rate to produce the same physical effect as an unknown rf power with a 5 gallon per minute liquid coolant flow rate. The physical effect is the dissipation of heat by the liquid coolant.

1-10. The meter panel contains a circuit breaker for application and removal of operational power and for overload protection, meters and indicator lamps for monitoring purposes, a control to provide a means of calibrating the rf power meter, and a relay to provide an interlock function to the 10-kw power amplifiers.

1-11. There is a flow rate meter that measures the liquid coolant flow rate; a differential thermocouple that develops a potential relative to differences in liquid coolant temperature; gate valves to route the liquid coolant to the heater or the water load and to regulate the rate of liquid coolant flow; and liquid coolant flow interlock switches that light indicator lamps and actuate the relay on the meter panel.

1-12. On dummy loads A and B a coaxial switch is provided to route the rf power from the 10-kw power amplifier to the antennas of the radio set or to the water load of the dummy load; three coaxial switches are provided for the same purpose on dummy load E. Further, contacts on the coaxial switch provide an interlock function for the power amplifiers.

1-13. On dummy load E, two indicator lamps are provided at the top front of the cabinet assembly to indicate which of two 10-kw power amplifiers is being used with the dummy load.

1-14. INFORMATION AND REFERENCE DATA

1-15. Tables 1-1 through 1-4 contain information to help you become familiar with the features and characteristics of the dummy load. The equipment required but not supplied for installation and testing of the dummy load is listed in table 1-5.

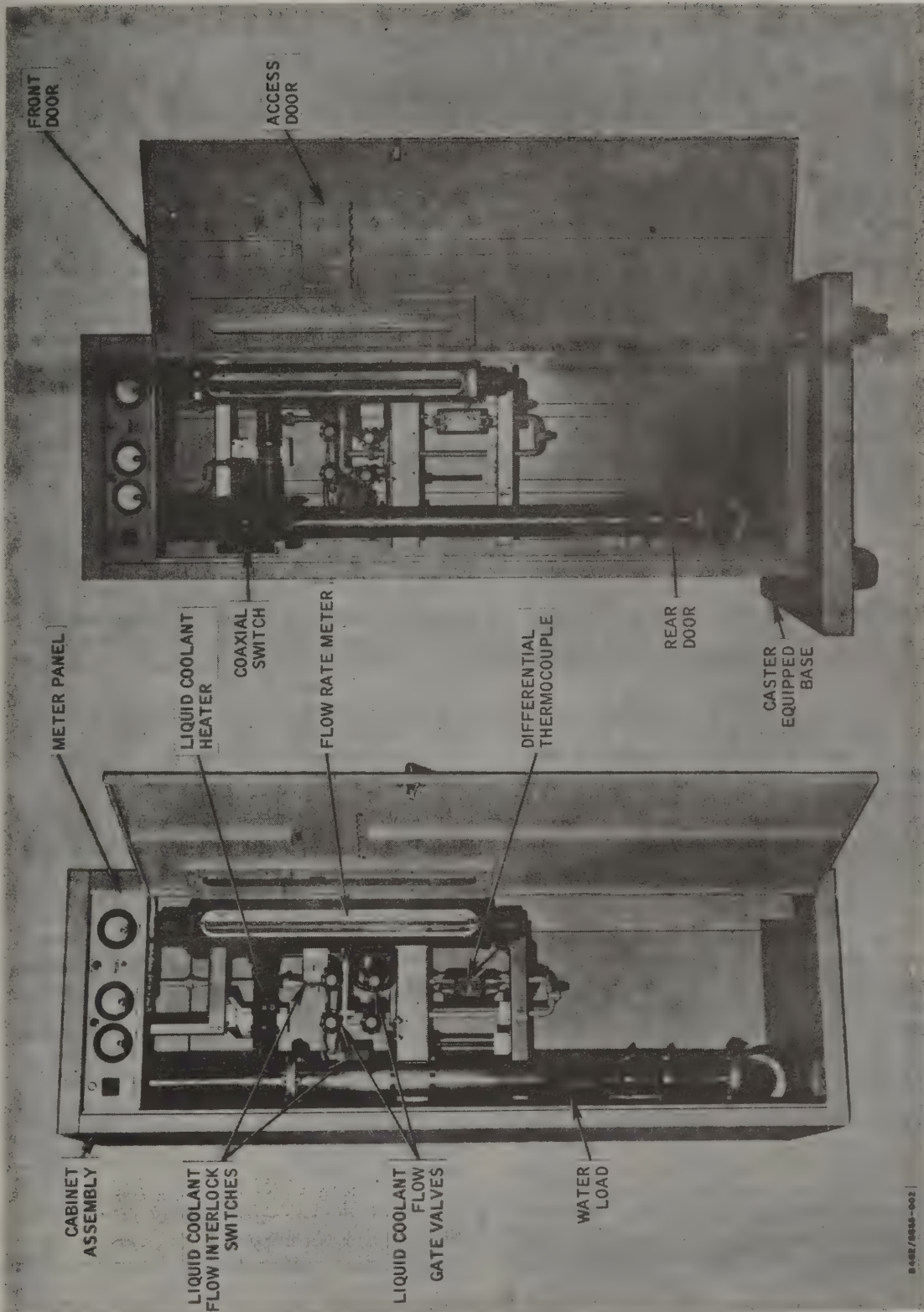
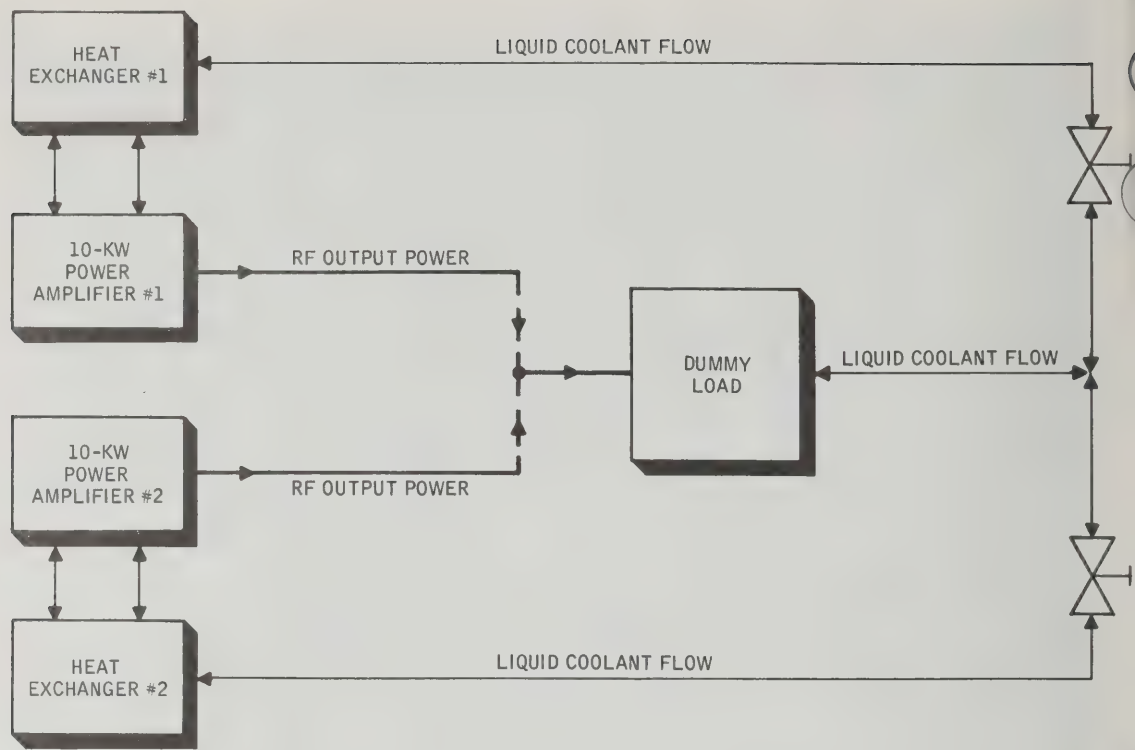


Figure 1-2. Dummy Load Assemblies



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Figure 1-3. Typical Dummy Load Application

- 1-16. Components of the dummy load will carry the number 9 as a reference designation prefix to identify them. and official nomenclature is given in table 1-1.
- 1-17. Dummy load letter designation, type,

Table 1-1. Dummy Load Identification

Official Nomenclature	Type	Dummy L
Calorimeter DA-272/FRC-39A(V).....	957	A
(nomenclature pending)	957A	B
Calorimeter DA-385/MRC-85(V)2.....	957D	C
Dummy Load, Electrical DA-319/MRC-98	957B	D
Calorimeter DA-358/FRC-39A(V)7.....	957G	E

Table 1-2. Leading Particulars

- Primary ac power..... 208 vac \pm 10.4 v, 50 to 60 cps, single-phase, 10 amperes (120 vac \pm 6 v from each line to neutral)
- Physical characteristics:
(Dummy loads A, C, D, and E):
Weight 350 lbs (approximate)
Dimensions 72 in. high, 23-9/16 in. wide, 22 in. deep

Table 1-2. Leading Particulars (cont)

(Dummy load B):
 Weight 350 lbs (approximate)
 Dimensions 75 in. high (est), 23-9/16 in. wide, 22 in. deep
 Transportability..... C124 or C130 aircraft, H-21 helicopter, or pick-up truck
 Storage conditions Dry atmosphere

Table 1-3. Capabilities and Limitations

Frequency range 755-985 mc
 Input impedance..... 50Ω nominal
 Output impedance..... 50Ω nominal
 RF power dissipation... 10 kilowatts continuously
 VSWR:
 Maximum 1.5:1
 Nominal 1.25:1
 Liquid coolant Ethylene glycol (52-1/2% maximum by volume) - water (deionized) solution
 Liquid coolant flow Calibrate at 1 gpm, power dissipation at 5 gpm

Environmental Considerations

Ambient temperature:
 Operating -29°C (-20°F) to +52°C (+126°F)
 Nonoperating -65°C (-85°F) to +71°C (+160°F)
 Relative humidity 100%
 Barometric pressure:
 Operating Sea level to about 10,000 ft
 Nonoperating Sea level to about 40,000 ft

Table 1-4. Equipment Supplied

Official Nomenclature	Mfg Part No.	Reference Designation	Common Name	Usable On Code	Qty	Description and Purpose
Calorimeter DA-272/ FRC-39A(V)	S-1902 (Type 957)	9	Dummy load	A	1	Flow type calorimeter which serves as load to 10-kw power amplifier output when testing and adjusting power amplifier
(Nomenclature Pending)	S-1902-1 (Type 957A)	9	Dummy load	B	1	Flow type calorimeter which serves as load to 10-kw power amplifier output when testing and adjusting power amplifier
Calorimeter DA-385/ MRC-85(V)2	S-1902-4 (Type 957D)	9	Dummy load	C	1	Flow type calorimeter which serves as load to 10-kw power amplifier output when testing and adjusting power amplifier
Dummy Load, Electrical DA-319/MRC-98	S-1902-3 (Type 957B)	9	Dummy load	D	1	Flow type calorimeter which serves as load to 10-kw power am-

Table 1-4. Equipment Supplied (cont)

Official Nomenclature	Mfg Part No.	Reference Designation	Common Name	Usable On Code	Qty	Description and Purpose
Dummy Load (cont)						
Calorimeter DA-358/ FRC-39A(V)7	S-1902-6 (Type 957G)	-----	Dummy load	E	1	plifier output whe testing and adjust ing power amplifi Flow type calorime which serves as l to 10-kw power an plifier output whe testing and adjust ing power amplifi
Coaxial switch, 50- ohm, 3-1/8-in. transmission line	S-5376	9A1S1 9A1S2 9A1S3	POSITION 1- POSITION 2 coaxial switch	E	3	
Connector	MS3108A-18-1S	9P1 9P2 9P3	-----	E	3	

Table 1-5. Equipment Required But Not Supplied

Description	Model No.	Manufacturer
Multimeter	AN/PSM-6	
Cloth, abrasive		
Cutter, tube, sliding feed member type,		
1/8 to 1 in. tube od cutting range		
Flaring tool, flares 3/16, 1/4, 5/16,		
3/8, 1/2, and 5/8 in. od copper or		
other thin wall tube		
Flux, soldering, paste, noncorrosive		
Packing, water valve, high grade		
Pliers, slip joint, straight nose,		
combined with cutter, 10 in.		
Pliers, gas, 8 in.		
Rags, wiping		
Reamer, hand taper, T-handle, 1/8-		
in. dia small end, 1/2-in. dia large		
end, 3-1/2 in. nominal length of flute,		
5-1/2 in. overall length		
Screwdriver, flat tip, 5/16-in. width,		
6 in. length		
Solder, solid core, 80% tin-20% lead		
Soldering gun, electric, 120 vac, 100		
watts		
Torch, soldering, kit		
Wrench, socket, hex shape, 3/8 in.		
Wrench, torque, dial indicating, 250 lb-		
in. rated capacity		
Wire, electrical, 20 AWG types DR,		
ANL, and tin coated MIL-W-3861,		
type B		

Table 1-5. Equipment Required But Not Supplied (cont)

Description	Model No.	Manufacturer	Qty
Wire, Electrical 16 AWG types DR, ANL, and tin coated MIL-W-3861, type B			*
Line section, 3-1/8 in., 50Ω, rf transmission	330-2-W/A (or equal).	Mectron Auto-Dryaire, Inc...	*
Elbow, miter 90°, 3-1/8 in., 50Ω, rf transmission	330-5-W/A (or equal).	Mectron Auto-Dryaire, Inc...	*
Anchor, insulator connector line, rf transmission (bullet)	320-14 (or equal)....	Mectron Auto-Dryaire, Inc...	*
Preformed packing (teflon spacer).....	308-835 (or equal) ...	Prodelin, Inc.	*
Return bend section.....	330-35-W/H (or equal)	Mectron Auto-Dryaire, Inc...	*
Bolt, hexhead, 3/8-16 x 1-3/4 in. long, cadmium plated or bronze			*
Nut, hex, 3/8-16			*
Lockwasher, 3/8 in.			*
Flatwasher, 3/8 in.			*
Screw, cap, hexagon head, 3/4, 10-UNC-2A			4
1/2 ton capacity hand hoist			1

* As required

CHAPTER 2

INSTALLATION

2-1. INTRODUCTION. This chapter furnishes the information you will need to install the dummy load. Section I contains data you will need in installation planning; Section II lists the

equipment supplied and provides logistical data. Installation procedures are given in Section III. Information you will need regarding preparation for reshipment is presented in Section IV.

SECTION I

INSTALLATION PLANNING

2-2. DETAILED SITE PLANS.

2-3. You should familiarize yourself with the detailed site plans for your particular station prior to the installation of the dummy load. These plans will give you the layout requirements for the dummy load.

2-4. AC POWER AND GROUNDING REQUIREMENTS.

2-5. Primary power requirement for the dummy load is 208 vac ± 10.4 v, 60 ± 3 cps, single-phase, 10 amperes, with 120 vac ± 6 v from each line to neutral.

2-6. The dummy load must be grounded by means of a copper wire (AWG NO. 16) attached from terminal board 9TB1 (located on the inside top of the dummy load) terminal 4, to station ground.

2-7. EQUIPMENT LOCATION.

2-8. The location of the dummy load is critical because there will be rigid rf transmission line runs between the 10-kw power amplifier and the dummy load. Plan the placement of the dummy load to facilitate the rf interconnection between the dummy load and 10-kw power amplifier without placing stress on the rigid rf transmission line.

2-9. Also, the dummy load must be placed in a position where access can be made to the liquid

coolant flow from the heat exchanger. Refer to your detailed site plans for the exact location. Figure 2-1 gives a typical dummy load installation diagram.

2-10. LINE SUPPORTS.

2-11. The rigid rf transmission line is a relatively thin-walled structure and must be adequately supported, by clamps or other means, to insure that undue stresses will not be placed on it or its flanges.

2-12. Clamping arrangements used should be constructed and applied so that no crushing or deforming of the transmission line occurs.

2-13. The liquid coolant plumbing lines should be adequately supported, by clamps or other means, to insure no vibration.

2-14. WORK AREA FOR DUMMY LOAD INSTALLATION.

2-15. Normally, the rigid rf transmission line is furnished in 20-foot lengths. A work area of approximately 25x5 feet is necessary when working with the 20-foot lengths.

2-16. When fabricating desired lengths of transmission line, brazing will be in accordance with MIL-B-7883.

2-17. DIMENSIONS.

2-18. Dummy load dimensions are provided in figure 2-1.

SECTION II

LOGISTICS

2-19. RECEIVING DATA.

2-20. The dummy load is packed in a crate lined with grease- and water-proof material. The crate contains the necessary bracing and padding to hold the dummy load securely in position. Table 2-1 provides shipping data for each of the dummy loads.

2-21. TRANSPORTABILITY AND MATERIAL HANDLING EQUIPMENT.

2-22. Overall dimensions of the dummy load permit airlifting by C-124 or C-130 aircraft or H-21 helicopter. It is suitable for ground transport by pick-up truck or rail.

2-23. A 1/2-ton capacity hand hoist or equivalent may be used for lifting the dummy load. Other moving equipment used depends upon what is available at a particular site.

2-24. The dummy load can be lifted and moved by four men.

2-25. UNPACKING.

2-26. Uncrate the dummy load and inspect it for any damage incurred during shipment. If there is any damage, notify your supervisor immediately. Save the crate and packing materials to substantiate claims with the transporting agency and to repack in the event of reshipment.

2-27. CABLE REQUIREMENTS.

2-28. Table 2-2 lists all interconnecting power and signal cables required for installation of the dummy load.

2-29. 50 OHM RIGID RF TRANSMISSION LINE.

2-30. Sufficient length of rf transmission line must be provided to connect the 10-kw power amplifier to the dummy load. Refer to your detailed site plans and determine required needs.

Table 2-1. Shipping Data

Crate	Contents	Qty	Crated (approx.)					Uncrated Dimensions (approx.) (in.)			Dummy Load	
			Dimensions (in.)			Volume (cu ft)	Weight (lb)	Dimensions (in.)				
			Hgt	W	D			Hgt	W	D		
1 of 1	Dummy load	1										
	Bushing, 3/4-in. od, 2-3/4 in. long	4	86	33	32	52.6	544	74	24	22	A, C, D	
1 of 1	Dummy load	1	89	38	35	68.5	602	77	30	28	B	
1 of 2	Dummy load	1										
	Bushing, 3/4-in. od, 2-3/4 in. long	4	86	33	32	52.6	544	74	24	22	E	
2 of 2	Coaxial switch, 50-ohm, 3-1/8-in.	3	44	26	22	14.6	85	--	--	--	E	
	Transmission line connector MS-3108A-18-15	3										

Table 2-2. Interconnecting Cabling

Dummy Load	From—	To—	Function	Wire Size	Type Connector
A, B, C, D, and E	Station ac power source	Terminal board 9TB1 terminals 1, 2, and 3	208 vac single-phase supply with a neutral line	AWG No. 16, three wires	5/16-in. lug
A, B, C, D, and E	Station ground	Terminal board 9TB1 terminal 4	Ground	AWG No. 16	5/16-in. lug
A, B, C, and D	Each 10-kw power amplifier terminal board 3TB4 terminal 5	Terminal board 9TB1 terminal 9	Interlock	AWG No. 20	5/16-in. lug
A, B, and C	Each 10-kw power amplifier terminal board 3TB4 terminal 6	Terminal board 9TB1 terminal 10	Interlock	AWG No. 20	5/16-in. lug
D	Each 10-kw power amplifier terminal board 3TB4 terminal 6	Terminal board 9TB1 terminal 8	Interlock	AWG No. 20	5/16-in. lug
E	10-kw power amplifier #1 terminal board 3TB4 terminal 5	Terminal board 9TB1 terminal 6	Interlock	AWG No. 20	5/16-in. lug
E	10-kw power amplifier #1 terminal board 3TB4 terminal 6	Terminal board 9TB1 terminal 5	Interlock	AWG No. 20	5/16-in. lug
E	10-kw power amplifier #2 terminal board 3TB4 terminal 5	Terminal board 9TB1 terminal 7	Interlock	AWG No. 20	5/16-in. lug
E	10-kw power amplifier #2 terminal board 3TB4 terminal 6	Terminal board 9TB1 terminal 8	Interlock	AWG No. 20	5/16-in. lug
E	Plug 9P1 pin A and I	Terminal board 9TB1 terminal 9	Interlock	AWG No. 20	5/16-in. lug
E	Plug 9P1 pin B	Terminal board 9TB1 terminal 10	Interlock	AWG No. 20	5/16-in. lug
E	Plug 9P1 pin H	Plug 9P3 pin A	Interlock	AWG No. 20	(Solder)
E	Plug 9P2 pin B	Terminal board 9TB1 terminal 11	Interlock	AWG No. 20	5/16-in. lug
G	Plug 9P2 pin A and I	Terminal board 9TB1 terminal 12	Interlock	AWG No. 20	5/16-in. lug
E	Plug 9P2 pin H	Plug 9P3 pin H	Interlock	AWG No. 20	(Solder)
E	Plug 9P3 pin E	Terminal board 9TB1 terminal 13	Interlock	AWG No. 20	5/16-in. lug
E	Plug 9P3 pin B	Terminal board 9TB1 terminal 14	Interlock	AWG No. 20	5/16-in. lug
E	Plug 9P3 pin I	Terminal board 9TB1 terminal 15	Interlock	AWG No. 20	5/16-in. lug
E	Plug 9P3 pin G	Terminal board 9TB1 terminal 16	Interlock	AWG No. 20	5/16-in. lug
E	Plug 9P3 pins D and F	Terminal board 9TB1 terminal 17	Interlock	AWG No. 20	5/16-in. lug

SECTION III

INSTALLATION PROCEDURES

2-31. TOOLS AND TEST EQUIPMENT.

2-32. Installation and postinstallation test procedures are performed using the tools and test equipment listed in table 1-4.

2-33. DUMMY LOAD INSTALLATION.

2-34. TYPICAL DUMMY LOAD INSTALLATION.

2-35. Dummy load installation procedures may vary with configuration; therefore, a typical dummy load installation is provided.

2-36. Refer to figures 2-1, 2-2 and 2-3 while performing the following installation procedures:

a. Place the dummy load in the planned installation location. Refer to figure 2-1 for mounting information and dummy load dimensions; secure the cabinet with four 3/4-10-UNC-2A hexhead capscrews inserted through four 3/4-in. OD, 2-3/16 in. long bushings.

CAUTION

Installation of the plumbing lines should not be started until support clamps have been placed or can be installed concurrently with the plumbing.

b. Install plumbing (fig. 2-2) between the dummy load and the reducing tees (5) of the liquid coolant distribution system. Typical components used in the installation are:

- (1) Elbow, 90° female, flate tube, brass with 41 FS nuts (2 each)
- (2) Tube, copper, type K, hard, 1/2-inch ID x 0.625 OD x 0.040 wall (length as required)

(3) Elbow, 90°, 1/2-inch, copper to copper, solder fitting (8 each)

(4) Union, 1/2-inch, copper to copper, solder fitting (2 each)

c. Install the rigid rf transmission line (fig. 2-3) between the dummy load and power amplifier as follows:

NOTE

Do not perform the following procedures for dummy load C and D until they are to be used.

CAUTION

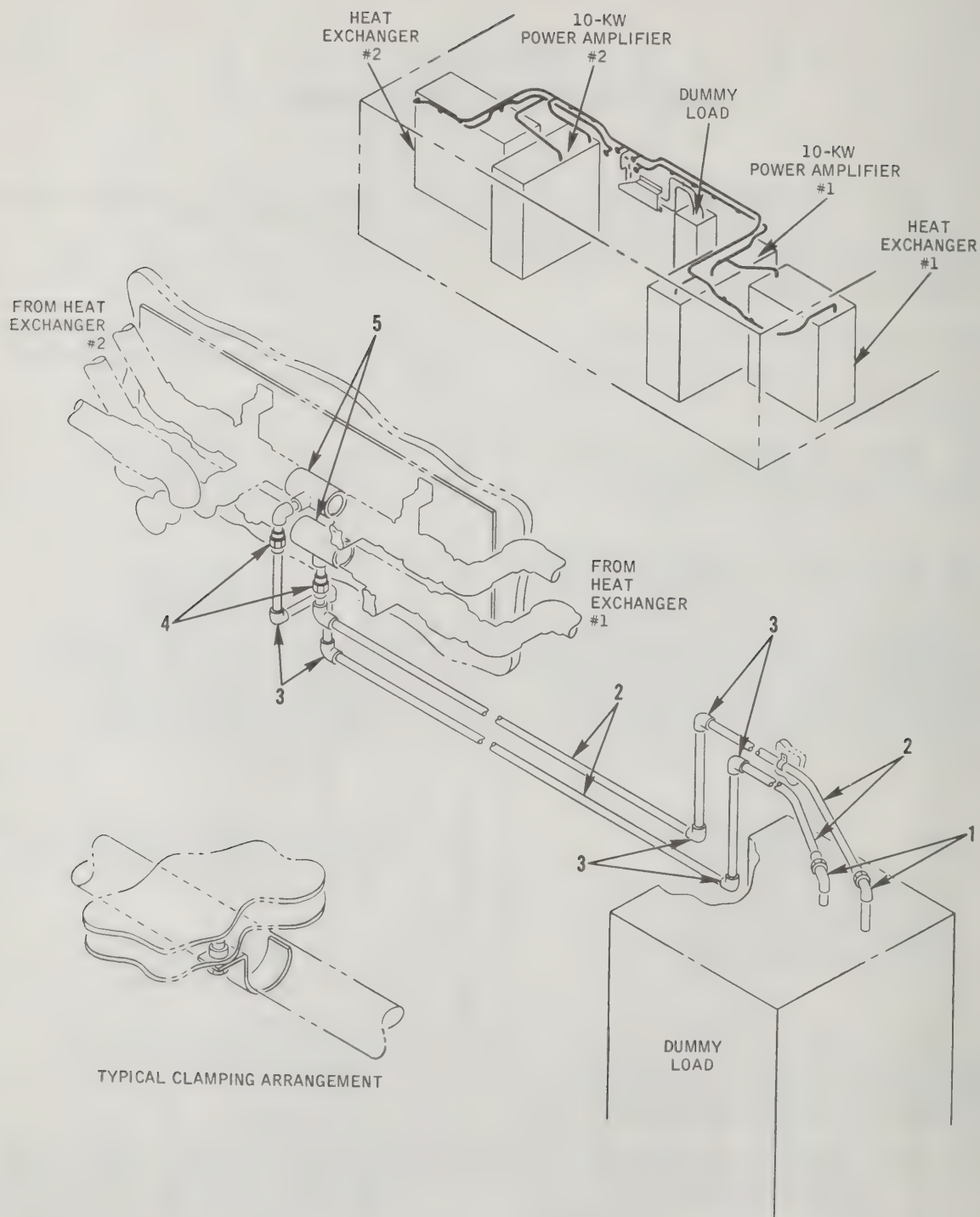
Installation of the rigid rf transmission line should not be started until support clamps (fig. 2-3, detail A and B) have been placed or can be installed concurrently with the line installation.

- (1) Assemble the line sections (for one power amplifier at a time) at the approximate location where they are to be installed.

CAUTION

Two men should work together handling the line sections to prevent any denting of the line surface.

- (2) Insert a bullet (fig. 2-3, detail C) and teflon spacer, one each, where flanges join together, and insert the line sections into the support clamps. Insure that the line sections are resting on the rubber gaskets at all contact points. Do not tighten the support clamps.



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Figure 2-2. Typical Dummy Load Liquid Coolant Supply

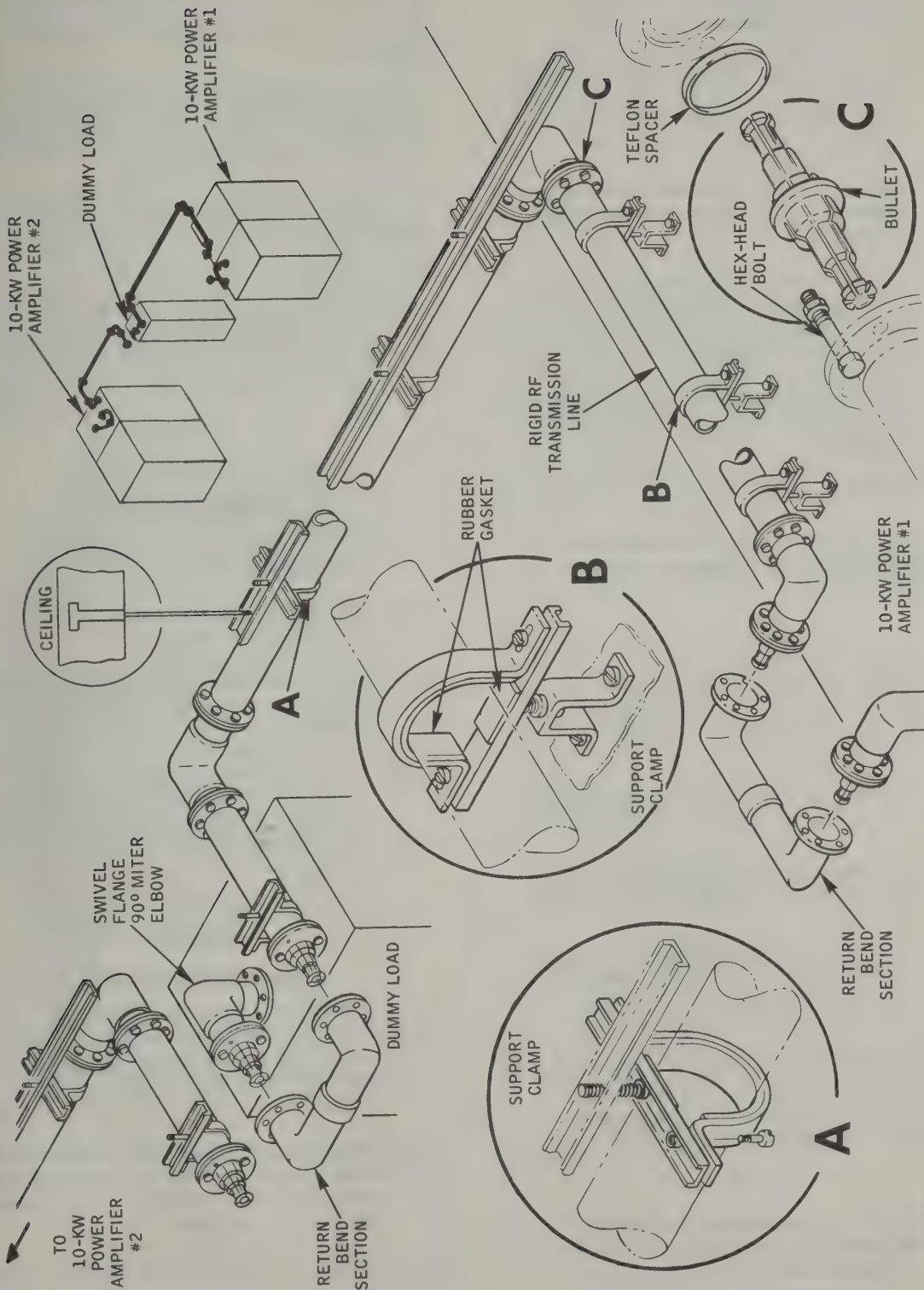


Figure 2-3. Typical RF Connection to Dummy Load

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- (3) Mate the connecting flanges together by moving them around as required to achieve the proper mating.
- (4) Place a 3/8-inch flat washer on each of six 3/8-16 by 1-3/4-inch hexhead bolts to be installed at each of the mated flanges.
- (5) Insert each of the six bolts through the flange mounting holes at each of the flanges.
- (6) Install a 3/8-inch flat washer, a 3/8-inch lockwasher, and a 3/8-16 nut into the threaded end of each of the bolts. Finger tighten the nuts.
- (7) Adjust the height of the support clamps as required to level the complete line section.
- (8) Tighten all support clamps.
- (9) With a torque wrench, tighten all hex-head bolts at the flanges to 18 foot-pounds.

NOTE

Install the rigid rf transmission line for the other power amplifier (if required) repeating the procedures of steps (1) through (9).

- (10) Insert a bullet and teflon spacer in the rf input flange of the dummy load.
- (11) Mate a swivel flange 90° miter elbow with the rf input flange of the dummy load.
- (12) Place a 3/8-inch flat washer on each of six 3/8-16 by 1-3/4-inch hexhead bolts and insert each of the bolts through the flange mounting holes.
- (13) Install a 3/8-inch flat washer, a 3/8-inch lockwasher, and a 3/8-16 nut onto the threaded end of each of the bolts. Finger tighten the nuts.

NOTE

The elbow installed on the dummy load has a bullet installed which is an integral part of the elbow.

- d. To complete the rf transmission path a

return bend section must be installed at the dummy load and power amplifier. (Steps c, (3) through (6) give applicable installation procedures.)

e. After installing the return bend sections at the dummy load and power amplifier tighten the bolts on the miter elbow flanges and return bend sections to 18 foot-pounds.

f. Refer to table 2-2 and figure 2-3 for cabling information and make the following connections:

- (1) Insure that wiring from the dummy load is of sufficient length to reach the terminal connections at each of the power amplifiers.

NOTE

On dummy loads C and D, the terminal board connections at the power amplifier are to be connected only when the dummy load is in use.

- (2) Run the wires from the power amplifiers to the dummy load.
- (3) Insert the wiring through the opening in the top of the dummy load cabinet assembly.
- (4) Make required equipment interconnections to terminal board 9TB1 in the top of the dummy load cabinet assembly using the interconnecting cabling information given in table 2-2.

WARNING

Lethal voltages are used in the dummy load. Insure that no power is applied at the source while making the power connections.

- (5) Make the required power input connections from the station ac power source using the interconnecting cabling information given in table 2-2.

2-37. MOBILE DUMMY LOAD INSTALLATION.

2-38. Dummy load B is caster mounted on a

base and can be positioned to the desired location for installation.

2-39. The following connections must be made:

- a. Make suitable rf input and output connections between the flanges of the 3-1/8-inch 50-ohm rf transmission lines of the dummy load and the power amplifier being used.
- b. Make suitable liquid coolant in, and liquid coolant out connections between the dummy load and the liquid coolant supply using 3/4-inch hose. Use a 3/4 to 1/2 inch standard pipe thread adapter at the dummy load connections.
- c. Make a jumper connection between terminals 3 and 4 on terminal board 9TB1 (fig. 2-1) mounted in the top of the dummy load cabinet assembly.

WARNING

Lethal voltages are used in the dummy load. Exercise extreme care.

- d. Refer to table 2-2 and make interlock connections between the power amplifier to be used and the dummy load. This will be from terminals 9 and 10 of dummy load terminal board 9TB1 to terminals 5 and 6 of terminal board 3TB4 in the power amplifier.

CAUTION

Refer to the schematic diagram of Chapter 6 and check for the proper input voltages.

- e. Make power connections between terminals 1, 2, and 3 of terminal board 9TB1 of the dummy load and the station power source.

2-40. INSTALLATION PROCEDURES PERTINENT TO SPECIFIC DUMMY LOADS.

2-41. DUMMY LOADS A AND B. Dummy

loads A and B may route the rf power through the POSITION 1 - POSITION 2 coaxial switch of the dummy load to the antennas of the radio set; or, the output may be routed to a 50-kw power amplifier in a 50-kw radio set configuration.

2-42. If the rf power is routed through the dummy load to ancillary equipment, connect a swivel flange 90° miter elbow to the rf output flange of the dummy load performing the procedures given in paragraph 2-36, steps c (10) through (13).

2-43. DUMMY LOAD E. Dummy load E may have optional installation arrangements. Coaxial switches are supplied with the dummy load and are provided for external installation.

2-44. Connect the wiring and rigid rf transmission line connections as given in table 2-2 and shown in the schematic diagram of the dummy load in Chapter 6.

2-45. POSTINSTALLATION INSPECTION.

2-46. An inspection of the following items must be made after installation.

- a. Check that all fastening hardware is secure.
- b. Check that all tools have been removed from the cabinet.
- c. Check insulation of all ac power leads to insure that no shorts or worn places are present.
- d. Check all coolant lines to insure there are no leaks.

2-47. POSTINSTALLATION ADJUSTMENTS AND TEST.

2-48. Perform the initial adjustments and test given in Chapter 5.

SECTION IV

PREPARATION FOR RESHIPMENT

2-49. DISASSEMBLY AND REMOVAL OF DUMMY LOAD.

2-50. Procedures for preparation of the dummy load for reshipment consist of removal of the unit and repackaging in the original shipping crate, or equivalent.

2-51. Removal of the unit is performed in the reverse order of the applicable installation procedures outlined in paragraphs 2-36 through 2-44.

2-52. When repackaging the equipment for shipment, all fasteners (such as bolts, cap-

screws and machine screws) should be attached to their associated components. If this is not possible, all small hardware used for each assembly should be grouped together and packaged for shipment in cloth bags. All such packages of hardware and miscellaneous equipment should be labeled clearly, and precautions should be made to prevent loss during shipment.

2-53. A moderate quantity of desiccant dehydrator should be included in the equipment crate when the dummy load is being repackaged to ensure a dry atmosphere during shipment or storage. Distribute packets of desiccant (available in sizes up to 1 pound) evenly throughout the repackaged equipment.

CHAPTER 3

OPERATION

3-1. INTRODUCTION. This chapter, divided into three sections, gives instructions necessary to operate the dummy load. Section I lists controls and indicators used in equipment opera-

tion; Section II describes procedures for turn on, operation, and turn off of the dummy load. Section III, Emergency Operation, is not applicable.

SECTION I

CONTROLS AND INDICATORS

3-2. IDENTIFICATION OF CONTROLS AND INDICATORS.

3-3. Figures 3-1 and 3-2 and table 3-1 illustrate and describe the functions of controls and indicators of the dummy load. The number in the key column of the table corresponds to

the numbered callout on the applicable figure.

3-4. INTERLOCK SWITCHES.

3-5. Table 3-2 lists and describes the functions of the interlock switches used in the dummy load.

Table 3-1. Dummy Load Controls and Indicators (See figure 3-1)

Key	Name	Reference Designation	Function
1	MAIN POWER lamp (white)	9A3DS1	Lights when ac power is applied
2	MAIN POWER circuit breaker	9A3CB1	Applies ac power to the dummy load
3	HEATER VOLTAGE meter	9A3M1	Indicates liquid coolant heater voltage
4	LOAD FLOW lamp (amber)	9A3DS3	Lights in event of insufficient liquid coolant flow through the water load
5	HEATER CURRENT meter	9A3M2	Indicates liquid coolant heater current
6	HEATER FLOW lamp	9A3DS2	Lights in event of insufficient liquid coolant flow through the liquid coolant heater
7	POWER METER CALIBRATION control	9A3R2	Calibrates RF POWER meter
8	POSITION 1-POSITION 2 coaxial switch	9A1S1*	In POSITION 1, routes the power amplifier output to the antenna. In POSITION 2, connects the power amplifier output to the water load of the dummy load
9	RF POWER meter	9A3M3	Indicates amount of rf power dissipated in the water load
10	D. L. FLOW gate valve		Regulates liquid coolant flow through the water load
11	HEATER FLOW gate valve		Regulates liquid coolant flow through the liquid coolant heater

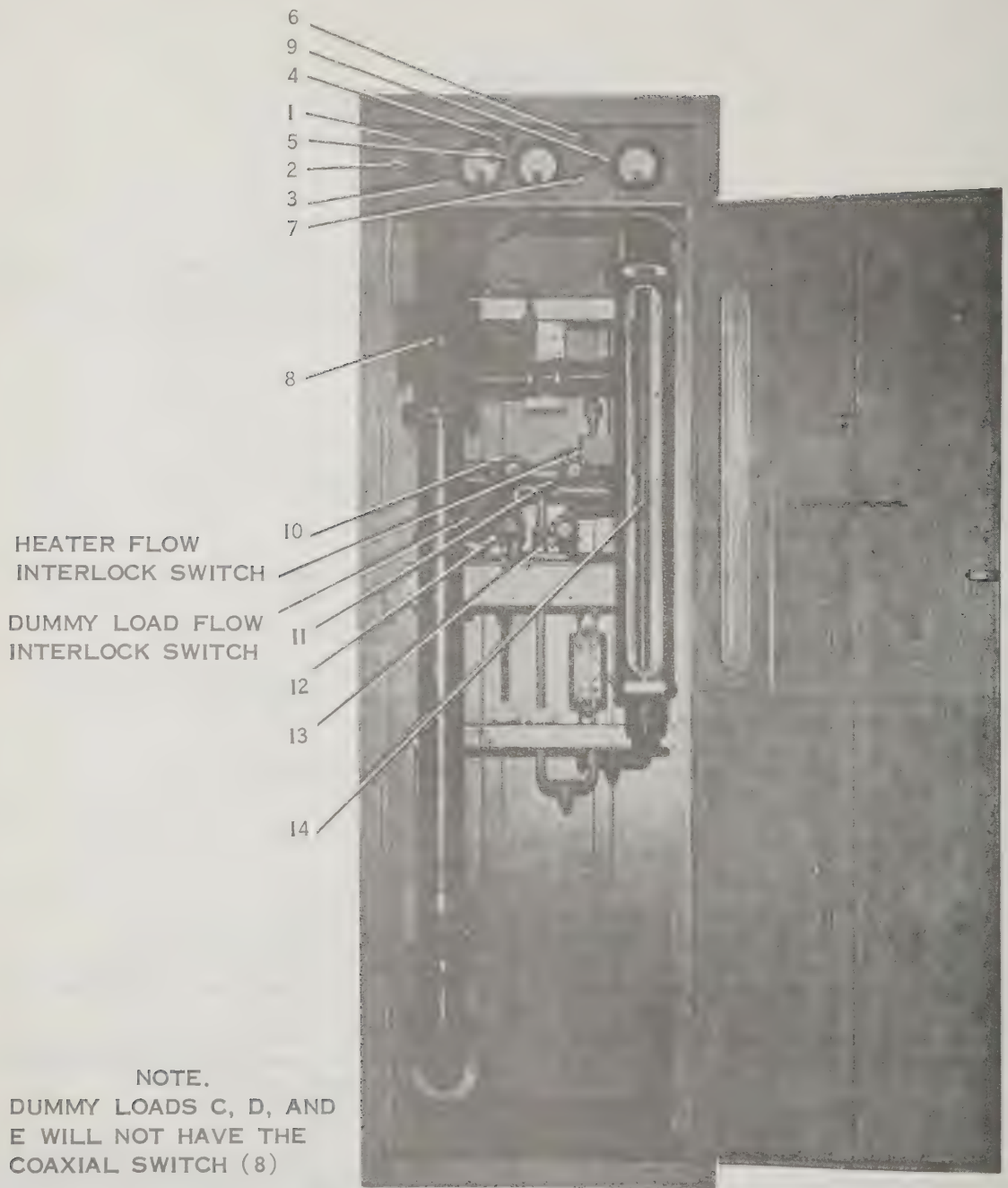


Figure 3-1. Dummy Load Controls and Indicators

Table 3-1. Dummy Load Controls and Indicators (See figure 3-1) (cont)

Key	Name	Reference Designation	Function
12	COOLANT IN gate valve	9A2M1	Regulates liquid coolant flow into the dummy load
13	COOLANT OUT gate valve		Regulates liquid coolant flow out of the dummy load
14	Flow rate meter		Indicates liquid coolant flow rate in gallons per minute
	AMPL #1 lamp		Lights when power amplifier #1 is being calibrated
	AMPL #2 lamp		Lights when power amplifier #2 is being calibrated

*NOTE: Dummy load E has 3 coaxial switches (9A1S1, 9A1S2, and 9A1S3) which are externally mounted in the rf transmission lines running from the power amplifier to the dummy load. These switches are used in conjunction as follows:

To route the rf power to the dummy load from power amplifier #1, coaxial switch 9A1S1 is set to POSITION 2 and coaxial switch 9A1S3 to POSITION 1. Coaxial switch 9A1S2 is set to POSITION 1 to route the rf power of power amplifier #2 to the antenna of the radio set. To route the rf power to the dummy load from power amplifier #2, coaxial switches 9A1S2 and 9A1S3 are set to POSITION 2. Coaxial switch 9A1S1 is set to POSITION 1 to route the rf power of power amplifier #1 to the antenna of the radio set.

**Refer to figure 3-2 for indicator lamps 9DS1 and 9DS2 which are mounted only on dummy load E.

Table 3-2. Dummy Load Electrical Interlocks (See figure 3-1)

Interlock Switch	Interlock Location	Equipment Disabled	Interlock Function
Liquid coolant heater flow interlock switch 9A2S1	Coolant plumbing assembly 9A2	Dummy load liquid coolant heater	Removes ac power from the liquid coolant heater when liquid coolant flow is insufficient
Dummy load flow interlock switch 9A2S2	Coolant plumbing assembly 9A2	Power amplifier under test	Provides an interlock function to the power amplifier when the water load liquid coolant flow is insufficient

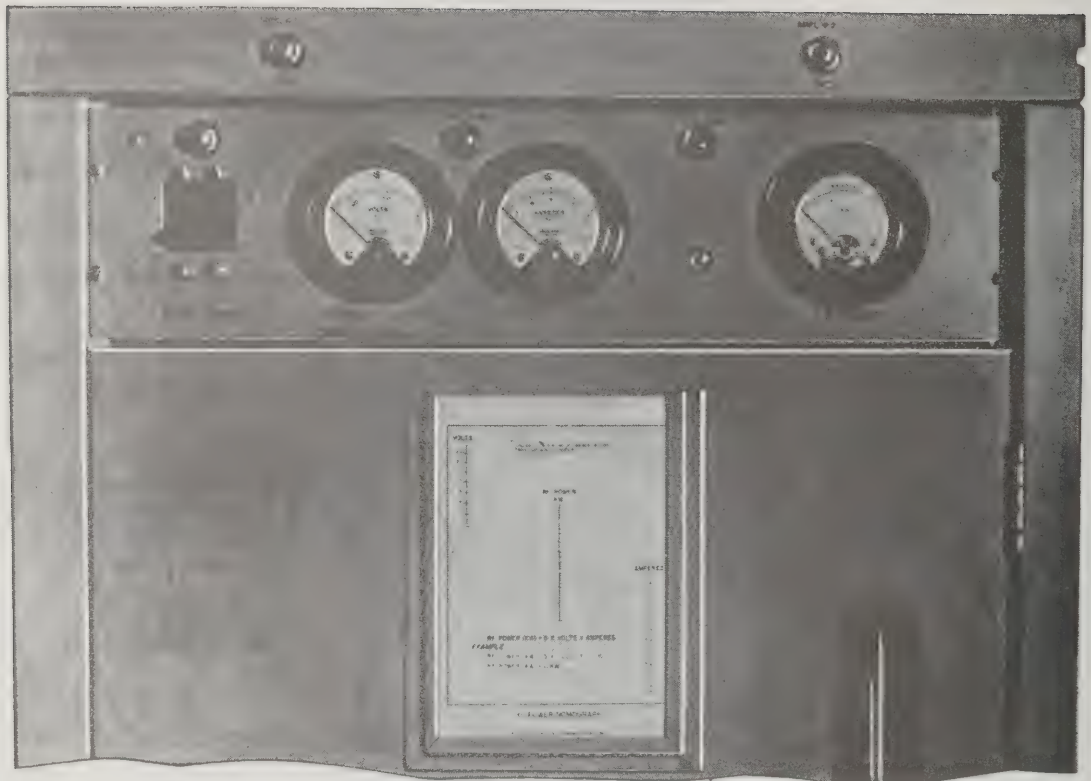


Figure 3-2. RF Power Nomograph Chart and Indicators

SECTION II

OPERATING INSTRUCTIONS

3-6. OPERATING PROCEDURES.

3-7. The operating procedures for the dummy load are given in the required sequence. Indicator lamps on meter panel 9A3 provide you with information on the status of the dummy load.

NOTE

For these operating procedures it is assumed that all necessary installation procedures of Chapter 2 and postinstallation tests of Chapter 5 have been completed.

3-8. PRELIMINARY CONTROL SETTINGS. Perform the following steps prior to placing the dummy load in operation:

a. Make preliminary inspection and installation as follows:

- (1) Check the fittings in the dummy load plumbing assembly to insure that no leakage is present.
- (2) Check that all rf transmission line fittings are secure.

NOTE

For dummy loads C and D perform the rigid rf transmission line installation as given in paragraph 2-36 step c.

- (3) Check that all electrical power connections are secure.
- (4) Check that all gate valves are closed.

b. Place the associated heat exchanger in operation in accordance with the instructions given in the heat exchanger technical manual.

c. Slowly operate (in the order listed) the following gate valves until fully opened:

- (1) COOLANT OUT
- (2) COOLANT IN

(3) HEATER FLOW

(4) D. L. FLOW

d. Check that the plumbing assembly does not leak.

e. Close the HEATER FLOW and D. L. FLOW gate valves.

f. Slowly open the HEATER FLOW gate valve fully and check that the flow rate meter indicates a liquid coolant flow of at least 1 gpm.

g. Close the HEATER FLOW gate valve.

h. Slowly open the D. L. FLOW gate valve fully and check that the flow rate meter indicates a liquid coolant flow of at least 5 gpm.

i. Close the D. L. FLOW gate valve.

NOTE

Step j is applicable to dummy loads A and B only.

j. Press the lock pushbutton on POSITION 1-POSITION 2 coaxial switch 9A1S1 and set the switch to POSITION 2.

NOTE

Step k is applicable to dummy load E only.

k. If power amplifier #1 is to be calibrated set POSITION 1-POSITION 2 coaxial switches 9A1S2 and 9A1S3 to POSITION 1; set switch 9A1S1 to POSITION 2. If power amplifier #2 is to be calibrated set POSITION 1-POSITION 2 coaxial switches 9A1S2 and 9A1S3 to POSITION 2; set switch 9A1S1 to POSITION 1.

3-9. TURN-ON PROCEDURE.

3-10. To turn on the dummy load, proceed as follows:

a. Set MAIN POWER circuit breaker 9A3CB1 to ON, MAIN POWER indicating lamp 9A3DS1 (white), HEATER FLOW lamp 9A3DS2 (amber) and LOAD FLOW lamp 9A3DS3 (amber) will light. HEATER VOLTAGE meter 9A3M1 and HEATER CURRENT meter 9A3M2 will both indicate zero.

NOTE

On dummy load E if power amplifier #1 is being calibrated, AMPL #1 indicator lamp 9DS1 will light. If power amplifier #2 is being calibrated, AMPL #2 indicator lamp 9DS2 will light.

b. Slowly open the HEATER FLOW gate valve until the flow rate meter indicates a flow of 1 gpm. HEATER FLOW indicator lamp 9A3DS2 will extinguish. HEATER VOLTAGE meter 9A3M1 must indicate 208 ± 10 volts and HEATER CURRENT meter 9A3M2 must indicate 8.8 ± 0.4 amperes. RF POWER meter 9A3M3 must indicate at least 7 kilowatts.

c. Allow five minutes for the liquid coolant and the plumbing assembly to come to a uniform temperature.

d. Record the indications of HEATER VOLTAGE (VOLTS) meter 9A3M1 and HEATER CURRENT (AMPERES) meter 9A3M2.

e. Place a straight edge on the RF POWER NOMOGRAPH chart, located on the front door of the dummy load cabinet below the meters. Align the straight edge so that it connects the recorded values of heater VOLTS and AMPERES on the chart (fig. 3-2).

f. Record the value of power at the point on the chart where the straight edge intersects the RF POWER KW column.

g. Adjust POWER METER CALIBRATION control 9A3R2 until the recorded value of power is indicated on RF POWER meter 9A3M3.

h. Close the HEATER FLOW gate valve. HEATER FLOW indicator lamp 9A3DS2 will light.

3-11. OPERATING PROCEDURE.

3-12. To operate the dummy load, proceed as follows:

a. Slowly open the D. L. FLOW gate valve until the flow rate meter indicates a flow of 5 gpm. LOAD FLOW indicator lamp 9A3DS3 (amber) will extinguish.

b. Insure that POSITION 1-POSITION 2 coaxial switch 9A1S1 is set to POSITION 2. On dummy load E, if power amplifier #1 is being calibrated, set coaxial switch 9A1S1 to POSITION 2, switches 9A1S2 and 9A1S3 to POSITION 1; if power amplifier #2 is being calibrated, set coaxial switch 9A1S1 to POSITION 1, switches 9A1S2 and 9A1S3 to POSITION 2.

NOTE

After allowing 5 minutes for liquid coolant plumbing to come to a uniform temperature notify the maintenance supervisor that the dummy load is ready for use. The dummy load will now indicate, on RF POWER meter 9A3M3, the true value of rf power applied from the power amplifier.

3-13. TURN-OFF PROCEDURE.

3-14. To turn off the dummy load, proceed as follows:

a. Close the D. L. FLOW, COOLANT IN, and COOLANT OUT gate valves.

b. Place MAIN POWER circuit breaker 9A3CB1 in the OFF position.

WARNING

Lethal potentials are present at the terminal boards of the dummy load. Exercise extreme caution when working inside the cabinet.

c. On dummy loads C or D, remove the interlock and rf power connections between the dummy load and the power amplifier.

d. On dummy loads A or B operate POSITION 1-POSITION 2 coaxial switch 9A1S1 to POSITION 1.

e. On dummy load E, set POSITION 1-POSITION 2 coaxial switches 9A1S1 and 9A1S2 to POSITION 1.

SECTION III
EMERGENCY OPERATION

NOT APPLICABLE

CHAPTER 4

PRINCIPLES OF OPERATION

4-1. **INTRODUCTION.** This chapter contains information on the principles of operation of the dummy load. Section I of this chapter contains a functional system operation description of the dummy load. Section II discusses the functional operation of the electronic circuits.

Section III, functional operation of mechanical assemblies, is not applicable. In order to follow the Section II discussion, refer to the circuit diagrams in Chapter 6.

SECTION I

FUNCTIONAL SYSTEM OPERATION

4-2. GENERAL

4-3. Functionally, the dummy load (fig. 4-1) is comprised of six distinct systems. These are the water load, measurement system, calibration system, rf distribution system, coolant distribution system, and ac power distribution system.

4-4. The dummy load serves two primary functions. The first is to dissipate the output power of a power amplifier during alignment; this is accomplished in the water load. The second is to measure the output power of the power amplifier; this is accomplished by the measurement system. All other systems are secondary and support the water load and measurement system.

4-5. WATER LOAD.

4-6. The rf input power is routed to the water load where it is dissipated as heat.

4-7. MEASUREMENT SYSTEM.

4-8. Input coolant from an external heat exchanger is routed to the measurement system. From the measurement system the coolant goes to the water load through a valve and an interlock. Coolant is then returned to the external

heat exchanger through the measurement system.

4-9. The measurement system consists of a differential thermocouple, a flow meter, and an rf metering circuit.

4-10. The differential thermocouple develops a voltage proportional to the difference in liquid coolant input and output temperatures.

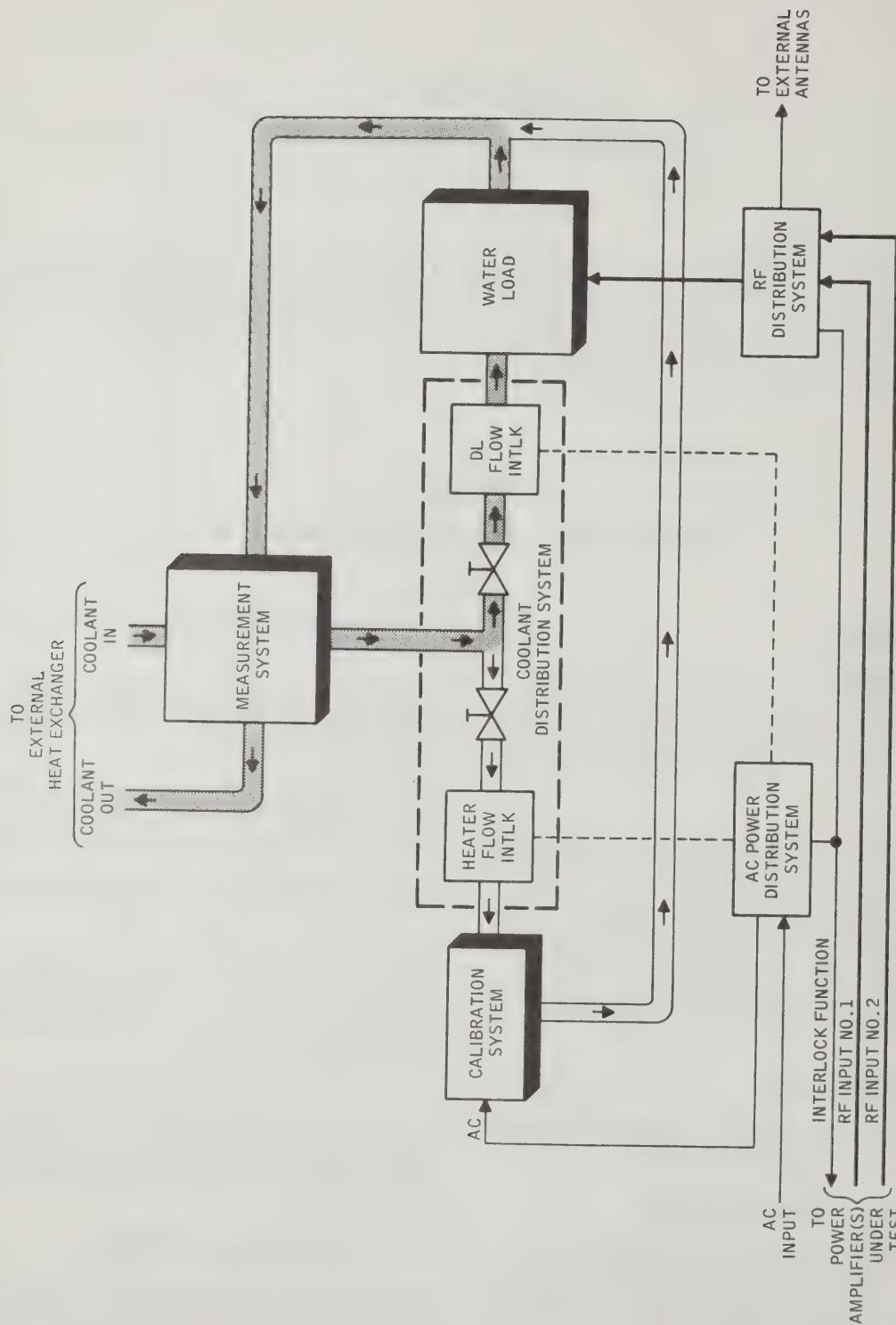
4-11. The flow meter measures the coolant rate of flow in gallons per minute.

4-12. The rf metering circuit measures the voltage developed by the differential thermocouple. It is calibrated to read directly in kilowatts when the coolant is flowing at a rate of 5 gallons per minute.

4-13. Since the power measured by the dummy load varies directly with heat and rate of flow, with a voltage proportional to the heat and the rate of flow known, power measurement can be accomplished.

4-14. CALIBRATION SYSTEM.

4-15. The calibration system is provided to heat the coolant with a known power (causing a known difference of temperature in the



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Figure 4-1. Dummy Load, Functional Block Diagram

differential thermocouple) in order to calibrate the rf meter in the measurement system.

4-16. The coolant flow to the water load during calibration is cut off. The coolant is routed instead to the calibration system, via a valve and interlock. The coolant is then returned to the external heat exchanger through the measuring system.

4-17. The calibration system contains a heater, a heater current meter, and a heater voltage meter.

4-18. With the heater current and voltage known the power can be determined, and the rf meter in the measuring system accurately adjusted.

4-19. RF DISTRIBUTION SYSTEM.

4-20. The rf distribution system routes the rf input to the water load. In some models of the dummy load a coaxial switch is provided to select either the water load or the radio set antenna as a termination for the rf input. Another model contains three coaxial switches which, in addition to controlling rf termination, select one of two rf inputs. These coaxial switches also have associated contacts that, in conjunction with the ac power distribution system, provide an interlock function for the power amplifier under test.

4-21. COOLANT DISTRIBUTION SYSTEM.

4-22. The coolant distribution system consists of valves, plumbing, and interlocks.

4-23. The heater flow and dummy load (dl) flow interlocks control their associated interlock switches in the ac power distribution system. These interlocks, in turn, are controlled by the coolant flowing through them.

4-24. AC POWER DISTRIBUTION SYSTEM.

4-25. The ac power distribution system contains a circuit breaker, two interlock switches (associated with the interlocks contained in the coolant distribution system), an interlock relay, and indicator lamps.

4-26. The circuit breaker turns the dummy load ac power on and off in addition to providing overload protection.

4-27. One interlock switch controls application of ac power to the heater in the calibration system. It opens the ac input to the heater in the event of insufficient coolant flow through the heater flow interlock in the coolant distribution system. The other interlock switch controls application of ac power to the interlock relay. In the event of insufficient coolant flow through the dl flow interlock in the coolant distribution system, it will deactuate the interlock relay. When the interlock relay is deenergized, its contacts open, terminating the operation of the power amplifier under test.

4-28. The ac power distribution system also controls the operation of various indicator lamps which indicate the status of the dummy load.

SECTION II

FUNCTIONAL OPERATION OF ELECTRONIC CIRCUITS

4-29. WATER LOAD.

4-30. Water load 9A1E1 (fig. 4-2) dissipates the rf energy from the power amplifier under test and transfers this energy, in the form of heat, to the circulating liquid coolant. The liquid coolant flowing through the water load is raised to a temperature proportional to the rf power applied.

4-31. MEASUREMENT SYSTEM.

4-32. During rf power measurement the liquid coolant flow is regulated to a flow rate of 5 gallons per minute (as measured by FLOW RATE meter 9A2M1) and passed through the input of differential thermocouple 9A2E1.

4-33. From the differential thermocouple the liquid coolant is passed through a valve, an interlock, water load 9A1E1, and out through the differential thermocouple.

4-34. The input liquid coolant passes over the negative element of the differential thermocouple. The liquid coolant, heated by the water load, passes over the positive element of the differential thermocouple as it flows out to FLOW RATE meter 9A2M1.

4-35. A voltage proportional to the difference in temperature of the input liquid coolant and output liquid coolant is developed by the differential thermocouple. This voltage represents a heat rise in the liquid coolant generated by the rf power dissipation in water load 9A1E1. (During calibration this voltage represents the heat generated by the power applied to liquid coolant heater 9A2HR1 and absorbed by the liquid coolant flowing through the heater. Calibration will be discussed in detail in subsequent paragraphs.)

4-36. The voltage developed by the differential thermocouple generates a current which flows through RF POWER meter 9A3M3. The meter deflection will indicate the rf power input from the power amplifier.

4-37. FLOW RATE meter 9A2M1 is actuated by liquid coolant flow through the meter. The height of a guided semibuoyant float in the tube of the flow rate meter is directly proportional to the flow rate of the liquid coolant through the meter. The flow rate can be read on a scale to the right of the float. The accurate indication will be at a point opposite the lower edge of the float head.

4-38. POWER METER CALIBRATION control 9A3R2 is provided to adjust the reading on RF POWER meter 9A3M3 during calibration.

4-39. CALIBRATION SYSTEM.

4-40. During calibration the liquid coolant flow is regulated to a flow rate of 1 gallon per minute and passed through the input of differential thermocouple 9A2E1 in the measurement system.

4-41. From the differential thermocouple the liquid coolant is passed through a valve, an interlock, liquid coolant heater 9A2HR1, and out through the differential thermocouple.

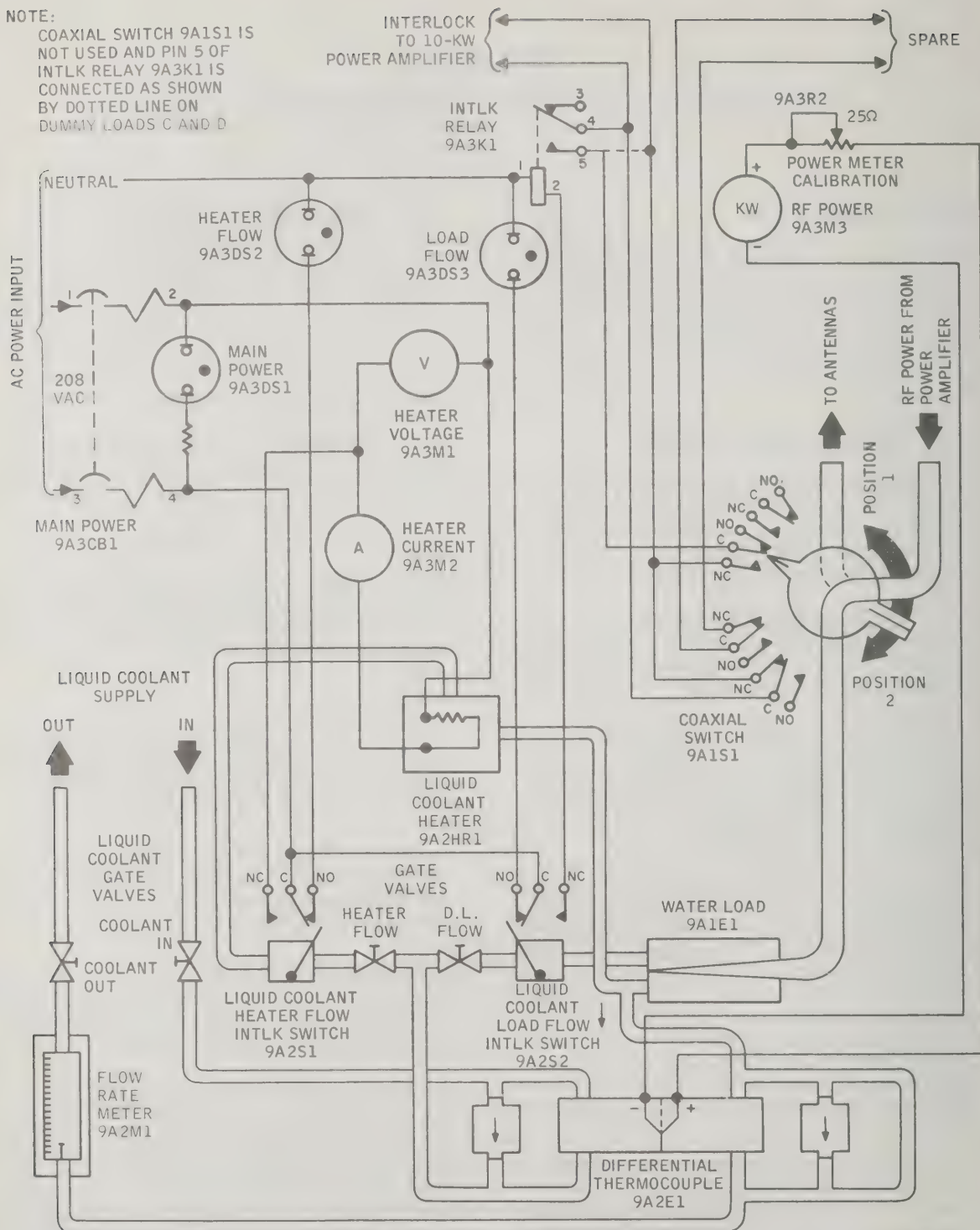
4-42. The liquid coolant flowing through liquid coolant heater 9A2HR1 is raised to a temperature proportional to the power consumed by the liquid coolant heater.

4-43. HEATER VOLTAGE meter 9A3M1 will indicate the voltage applied to, and HEATER CURRENT meter 9A3M2 the current flowing through, the liquid coolant heater.

4-44. The power consumed by the liquid coolant heater is approximately 2 kw. With a coolant flow rate of 1 gallon per minute (1/5 of the flow rate during rf power measurement) RF POWER meter 9A3M3 in the measurement system should indicate 10 kw (5 times the power applied to the liquid coolant heater). This value of power was chosen because the dummy

NOTE:

COAXIAL SWITCH 9A1S1 IS NOT USED AND PIN 5 OF INTLK RELAY 9A3K1 IS CONNECTED AS SHOWN BY DOTTED LINE ON DUMMY LOADS C AND D



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Figure 4-2. Dummy Load, Simplified Schematic Diagram

load is normally used with a power amplifier having a 10-kw output.

4-45. With the liquid coolant heater voltage and current known, the RF POWER NOMOGRAPH (attached to the outside of the dummy load cabinet) is used to determine the exact indication to which RF POWER meter 9A3M3 is to be calibrated.

4-46. RF DISTRIBUTION SYSTEM.

4-47. On dummy loads C and D, the rf power from the power amplifier is routed directly to water load 9A1E1 of the dummy load. On dummy loads A and B, POSITION 1-POSITION 2 coaxial switch 9A1S1 is mounted in the rf transmission line path to control the routing of the rf power from the power amplifier. On dummy load E, POSITION 1-POSITION 2 coaxial switches 9A1S1, 9A1S2, and 9A1S3 are mounted in the rf transmission line paths from the two power amplifiers to control the routing of rf power to the dummy load or to the antennas of the radio set.

4-48. Dummy loads A and B have a POSITION 1-POSITION 2 coaxial switch, 9A1S1, which has the capability of routing an rf input to one of two paths. In POSITION 1 the rf input is routed to the antenna of the radio set.

4-49. With POSITION 1-POSITION 2 coaxial switch in POSITION 2 (rf power measurement) rf power will be routed through the coaxial switch and rf transmission line to water load 9A1E1.

4-50. Dummy load E (see fig. 6-3) has three POSITION 1-POSITION 2 coaxial switches, 9A1S1, 9A1S2 and 9A1S3. To route the rf power to the dummy load from power amplifier #1, coaxial switch 9A1S1 is set to POSITION 2 and coaxial switch 9A1S3 to POSITION 1. Coaxial switch 9A1S2 is set to POSITION 1 to route the rf power of power amplifier #2 to the antenna of the radio set. To route the rf power to dummy load from power amplifier #2, coaxial switches 9A1S2 and 9A1S3 are set to POSITION 2. Coaxial switch 9A1S1 is set to POSITION 1 to route the rf power of power amplifier #1 to the antenna of the radio set.

4-51. In dummy load A and B (fig. 4-2), with switch 9A1S1 in POSITION 2, the lower C and NC contacts of the upper group of contacts will be closed. The interlock continuity will be provided to the power amplifier (assuming normal

coolant flow) through closed contacts 4 and 5 of interlock relay 9A3K1. In POSITION 1 (rf applied to the radio set antenna) the lower C and NC contacts of the bottom group of contacts will be closed, providing interlock continuity directly.

4-52. In dummy load E (see fig. 6-3) interlock continuity is provided by the associated contacts of the three coaxial switches, 9A1S1, 9A1S2, and 9A1S3.

4-53. With the output of power amplifier #1 connected to the dummy load and the output of power amplifier #2 connected to the radio set antenna, switch 9A1S1 will be in POSITION 2, switch 9A1S2 will be in POSITION 1, and switch 9A1S3 will be in POSITION 1.

4-54. Interlock continuity to power amplifier #1 will be from terminal board 9TB1-5 to 9TB1-6, through 9A3TB1-12, closed contacts 4 and 5 of relay 9A3K1 (assuming normal coolant flow), 9A3TB1-11, 9TB1-14, plug 9P3-B, 9J3-B, the closed contacts of switch 9A1S3, 9J3-A, 9P3-A, 9P1-H, 9J1-H, closed contacts of switch 9A1S1, 9J1-I, and 9P1-I.

4-55. Interlock continuity to power amplifier #2 will be from terminal board 9TB1-7 to 9TB1-8, through plug 9P2-A, 9J2-A, the closed contacts of switch 9A1S2, 9J2-B, and 9P2-B.

4-56. With the output of power amplifier #1 connected to the radio set antenna and the output of power amplifier #2 connected to the dummy load, switch 9A1S1 will be in POSITION 1, switch 9A1S2 will be in POSITION 2, and switch 9A1S3 will be in POSITION 2.

4-57. Interlock continuity to power amplifier #2 will be from terminal board 9TB1-8 to 9TB1-7, through 9A3TB1-16, closed contacts 10 and 11 of relay 9A3K1 (assuming normal coolant flow), 9A3TB1-15, 9TB1-15, plug 9P3-I, 9J3-I, closed contacts of switch 9A1S3, 9J3-H, 9P3-H, 9P2-H, 9J2-H, closed contacts of switch 9A1S2, 9J1-I and 9P2-I.

4-58. The interlock continuity to power amplifier #1 will be from terminal board 9TB1-6 to 9TB1-5, through plug 9P1-A, 9J1-A, the closed contacts of switch 9A1S1, 9J1-B, and 9P1-B.

4-59. With both power amplifier outputs connected to the radio set antennas, switch 9A1S1 will be in POSITION 1, and switch 9A1S2 will

be in POSITION 1; the position of switch 9A1S3 does not affect the operation.

4-60. Interlock continuity to power amplifier #1 is the same as given in paragraph 4-58. Interlock continuity to power amplifier #2 is the same as given in paragraph 4-55.

4-61. COOLANT DISTRIBUTION SYSTEM.

4-62. The coolant distribution system (fig. 4-2) consists of four gate valves, COOLANT IN, COOLANT OUT, HEATER FLOW, and D. L. FLOW; two interlocks, liquid coolant heater flow 9A2S1, and liquid coolant load flow 9A2S2; and associated plumbing.

4-63. The COOLANT IN gate valve regulates the amount of liquid coolant into the dummy load.

4-64. The COOLANT OUT gate valve regulates the flow rate of the liquid coolant from the dummy load.

4-65. The input liquid coolant is routed to a junction of HEATER FLOW and D. L. FLOW gate valves. The HEATER FLOW gate valve allows flow of liquid coolant to the heater. The D. L. FLOW gate valve allows liquid coolant to flow to the water load. Only one flow gate valve is opened at a time, the other flow gate valve is closed.

4-66. The liquid coolant flow interlock switches (9A2S1 and 9A2S2) are protective devices in the plumbing of the dummy load. The protective interlock function of each interlock switch is operated by a discrete liquid coolant flow rate. The operating flow rate for the liquid coolant heater flow interlock switch 9A2S1 is 0.4 gallon per minute. The operating flow rate for liquid coolant load flow interlock 9A2S2 switch is 3 gallons per minute. When the flow rate is sufficient in either interlock switch a pressure, developed in the switch assembly, causes the switch to operate and activate its associated interlock switch in the ac power distribution system.

4-67. AC POWER DISTRIBUTION SYSTEM.

4-68. Main power from a 208-volt ac, 60-cps,

single-phase supply is applied to the dummy load by MAIN POWER circuit breaker 9A3CB1 (fig. 4-2). MAIN POWER indicator lamp 9A3DS1 lights when ac power is applied to the dummy load through the circuit breaker.

4-69. One line of the 208 vac is connected from the circuit breaker to liquid coolant heater 9A2HR1. The other 208 vac line from the circuit breaker is connected to liquid coolant heater flow interlock switch 9A2S1. If liquid coolant flow through the interlock is sufficient to operate the switch, the 208 vac (second line) will be connected to liquid coolant heater 9A2HR1 through the C and NC contacts of 9A2S1 and HEATER CURRENT meter 9A3M2. If liquid coolant flow is not sufficient, HEATER FLOW indicator lamp 9A3DS2 will be lit through contacts C and NO of 9A2S1.

4-70. A connection is made from one of the ac input lines, at the circuit breaker, to liquid coolant dummy load flow interlock switch 9A2S2. If the liquid coolant flow through the interlock switch is sufficient to actuate the switch, the voltage (120 vac to neutral) will be connected to interlock relay 9A3K1 through contacts C and NC. With 120 vac applied, the interlock relay will activate to close the interlock circuit (in association with the rf power distribution system) of the amplifier. If the coolant flow is not sufficient the contacts of relay 9A3K1 will open, terminating the operation of the power amplifier. Also, if the coolant flow is not sufficient, LOAD FLOW indicator lamp 9A3DS3 will be lit through contacts C and NO of interlock switch 9A2S2.

4-71. In dummy load E (fig. 6-3) a 208 vac line (120 vac to neutral) is also connected to indicator lamps AMPL #1, 9DS1; and AMPL #2, 9DS2. The neutral line is connected through the coaxial switches in the rf power distribution system (9A1S1, 9A1S2, and 9A1S3). Dependent upon the position of these switches, AMPL #1 indicator lamp 9DS1 will light when power amplifier #1 is connected to the dummy load; or AMPL #2 indicator lamp 9DS2 will light when power amplifier #2 is connected to the dummy load.

SECTION III
FUNCTIONAL OPERATION OF MECHANICAL ASSEMBLIES

NOT APPLICABLE



CHAPTER 5 MAINTENANCE

5-1. INTRODUCTION. This chapter contains the instructions you will need to maintain the dummy load. Section I gives general maintenance information and instructions for organizational/field maintenance. Section II gives instructions for special maintenance including removal and replacement procedures for assemblies of the dummy load.

5-2. The tables and procedures contained in this chapter, along with the data presented in the other chapters of this manual,

comprise the information necessary for complete maintenance of the dummy load. Repair parts are listed in appendix C and illustrated in chapter 6.

SECTION I ORGANIZATIONAL/FIELD MAINTENANCE

5-3. SCOPE.

5-4. This section contains the information required to maintain the dummy load in accordance with operational specifications. It is comprised of a list of test equipment required, a list of test points, initial adjustments and tests, and a performance test table.

5-5. TOOLS AND TEST EQUIPMENT.

5-6. Table 5-1 lists the test equipment required for organizational/field maintenance of the dummy load. The test equipment characteristics shown do not necessarily reflect the maximum capabilities of the equipment, but only those needed in testing the dummy load. The tools required but not supplied are listed in table 1-5. Before performing any test, make certain that the test equipment is properly and accurately calibrated.

5-7. DUMMY LOAD TEST POINTS.

5-8. The test points in the dummy load are listed in table 5-2 and are provided for your use as a maintenance aid. The table provides the location, applicability, reference designation, and circuit function of each test point.

5-9. INITIAL ADJUSTMENTS AND TESTS.

5-10. The following adjustments and tests of the dummy load shall be made after completion of the Chapter 2 installation procedures or after repairs to the dummy load. When desired results cannot be obtained, check immediately for the cause.

WARNING

Lethal voltages are present at the terminal boards of the dummy load. Exercise extreme caution when working inside the cabinet.

a. Set MAIN POWER circuit breaker 9A3CB1 to OFF. Insure that there is no liquid coolant flow by turning all gate valves fully clockwise.

b. Apply the main power from the station supply and check at terminals 2 and 14 of 9A3TB1 for 208 vac ± 10.4 v.

NOTE

The associated heat exchangers and power amplifier must be operating. All gate valves of the dummy load must be closed.

c. Operate MAIN POWER circuit breaker 9A3CB1 to ON. MAIN POWER 9A3DS1, HEATER FLOW 9A3DS2, and LOAD FLOW 9A3DS3 indicator lamps will light.

d. Slowly open the COOLANT IN gate valve fully. Check that there are no plumbing leaks and that there is no liquid coolant flow through the flow rate meter.

e. Open the COOLANT OUT gate valve. When the liquid coolant flow rate reaches 0.4 gallon per minute, HEATER FLOW indicator lamp 9A3DS2 should extinguish and HEATER VOLTAGE meter 9A3M1 and HEATER CURRENT meter 9A3M2 should indicate.

f. Slowly open the HEATER FLOW gate valve until a flow rate of 1 gallon per minute is indicated on flow rate meter 9A2M1. Insure that the plumbing is free of leaks.

NOTE

Allow 5 minutes for the liquid coolant and plumbing to come to a uniform temperature.

g. Rotate POWER METER CALIBRATION control 9A3R2 fully counterclockwise. Check that RF POWER meter 9A3M3 indication is at least 7 kw.

h. Rotate POWER METER CALIBRATION control 9A3R2 fully clockwise. Check that RF POWER meter 9A3M3 indication is at least 12 kw.

i. Fully close the HEATER FLOW gate valve; HEATER FLOW indicator lamp 9A3DS2 will again light and the meters will return to 0.

j. Slowly open the D. L. FLOW gate valve until a flow rate of 3 gallons per minute is indicated on flow rate meter 9A2M1; LOAD FLOW indicator lamp 9A3DS2 should extinguish. Continue opening the D. L. FLOW gate valve until a flow rate of 5 gallons per minute is indicated. Observe for any plumbing leaks.

5-11. If the conditions of steps a through j are not obtained, perform the test given in table 5-3 to determine the cause.

5-12. PERFORMANCE TEST TABLE.

5-13. Performance test table 5-3 provides sufficient information to allow you to make a thorough analysis of the dummy load under normal operating conditions.

NOTE

All steps of this table are not applicable to all dummy loads. Refer to the Applicable to Dummy Load column for steps applicable to your model.

5-14. If any test standard contained in table 5-3 can not be obtained, perform applicable troubleshooting procedures to determine the cause and correct the fault.

5-15. To perform the steps given in the performance test table use Multimeter AN/PSM-6.

5-16. DC VOLTAGE REQUIREMENTS AND SOURCES.

5-17. There is no dc voltage requirement, or source, for the dummy load.

Table 5-1. Test Equipment Required for Organizational/Field Maintenance

<u>Test Equipment</u>	<u>Characteristic</u>
Multimeter AN/PSM-6.....	Frequency range: 0-100 cps Voltage range: 0 to 300 vac Current range: 0 to 10 amperes (with multiplier) Resistance range: 0 to 100Ω Sensitivity: 1000Ω per vac

Table 5-2. Dummy Load Test Points

NOTE: Terminal board 9TB1 is located on the inside top of the dummy load. Terminal board 9A3TB1 is located on the bottom of meter panel 9A3.

Applicable to Dummy Load	Terminal Board Reference Designation	Circuit Function
A, B, C, D, and E	9TB1-1	208 vac power input (120 vac to neutral)
A, B, C, D, and E	9TB1-2	208 vac power input (120 vac to neutral)
A, B, C, D, and E	9TB1-3	Neutral input line
A, B, C, D, and E	9TB1-4	Frame ground
A, B, C, D, and E	9A3TB1-1	208 vac power input (120 vac to neutral)
A, B, C, D, and E	9A3TB1-2	208 vac power input (120 vac to neutral)
A, B, C, D, and E	9A3TB1-3	Liquid coolant heater flow interlock switch 9A2S1
A, B, C, D, and E	9A3TB1-4	Liquid coolant heater power
A, B, C, D, and E	9A3TB1-5	Liquid coolant heater power
A, B, C, D, and E	9A3TB1-6	Neutral input line
A, B, C, D, and E	9A3TB1-7	Liquid coolant load flow interlock switch 9A2S2
A, B, C, D, and E	9A3TB1-8	Interlock relay 9A2K1 connection
A, B, C, D, and E	9A3TB1-11	Interlock function
A, B, C, D, and E	9A3TB1-12	Interlock function
A, B, C, D, and E	9A3TB1-13	Liquid coolant heater flow interlock switch 9S2S1
A, B, C, D, and E	9A3TB1-14	Interlock function
A, B, and E	9TB1-8	Interlock function
A, B, and E	9TB1-9	Interlock function
A, B, and E	9TB1-10	Interlock function
A, B, and E	9TB1-11	Interlock function
A, B, and E	9TB1-12	Interlock function
C and D	9TB1-8	Interlock function
C and D	9TB1-9	Interlock function
E	9TB1-5	Power amplifier #1 interlock function
E	9TB1-6	Power amplifier #1 interlock function
E	9TB1-7	Power amplifier #2 interlock function
E	9TB1-8	Power amplifier #2 interlock function
E	9TB1-13	Indicator lamp DS1
E	9TB1-15	Interlock function
E	9TB1-16	Indicator lamp DS2
E	9TB1-17	Neutral input line

Table 5-3. Dummy Load Performance Test Table

WARNING

Lethal potentials are present at the terminal boards of the dummy load. Exercise extreme caution when performing test steps.

NOTE: For all steps, MAIN POWER indicator lamp 9A3DS1 will be lit. Also for dummy load E, indicator lamp AMPL #1 DS1 or AMPL #2 DS2 will be lit, indicating which power amplifier is being used. Unless otherwise indicated all tests will be made between the point of test and neutral (9TB1-3).

Step	Applicable to Dummy Load	Operation of Test Equipment	Point of Test	Control Settings and Operation of Equipment	Performance Standard
1	A, B, C, D, E	Set the multimeter range switch to 250V and the selector switch to AC	9TB1-1	Set MAIN POWER circuit breaker 9A3CB1 to ON	120 vac ± 6 v
2	A, B, C, D, E	Same as step 1	9TB1-2	Same as step 1	120 vac ± 6 v
3	A, B, C, D, E	Same as step 1	Between 9TB1-1 and 9TB1-2	Same as step 1	208 vac ± 10.4 v
4	A, B, C, D, E	Set the multimeter range switch to 2.5V and the selector switch to AC	9TB1-4	Same as step 1	0 vac
5	A, B, C, D, E	Same as step 1	9A3TB1-2	Same as step 1	120 vac ± 6 v
6	A, B, C, D, E	Same as step 1	9A3TB1-14	Same as step 1	120 vac ± 6 v
7	A, B, C, D, E	Same as step 1	Between 9A3TB1-2 and 9A3TB1-14	Same as step 1	208 vac ± 10.4 v
8	A, B, C, D, E	Same as step 1	9A3TB1-1	With MAIN POWER circuit breaker set to ON, close the D. L. FLOW gate valve and adjust HEATER FLOW gate valve for 1 gallon per minute liquid coolant flow. Set POSITION 1 - POSITION 2 coaxial switch 9A1S1 of dummy loads A and B to POSITION 1. (For dummy load E: when calibrating power amplifier #1 set coaxial switch 9A1S1 to POSITION 2 and	120 vac ± 6 v

NOTE: For steps 8 through 16, HEATER CURRENT meter 9A3M2 and HEATER VOLTAGE meter 9A3M1 and RF POWER meter 9A3M3 will be indicating and LOAD FLOW indicator lamp 9A3DS3 will be lit.

9	A, B, C, D, E	Same as step 1	9A3TB1-3	switches 9A1S2 and 9A1S3 to POSITION 1; when calibrating power amplifier #2 set coaxial switch 9A1S1 to POSITION 1, and switches 9A1S2 and 9A1S3 to POSITION 2.)	120 vac ± 6 v
10	A, B, C, D, E	Same as step 1	9A3TB1-4	Same as step 8	120 vac ± 6 v
11	A, B, C, D, E	Same as step 1	9A3TB1-5	Same as step 8	120 vac ± 6 v
12	A, B, C, D, E	Same as step 4	9A3TB1-6	Same as step 8	0 vac
13	A, B, C, D, E	Same as step 1	9A3TB1-7	Same as step 8	120 vac ± 6 v
14	A, B, C, D, E	Same as step 1	9A3TB1-8	Same as step 8	0 vac
15	A, B, C, D, E	Set the multimeter switch to X1 and the selector to OHMS	Between 9A3TB1-11 and 9A3TB1-12	Same as step 8	No continuity
16	A, B, C, D, E	Same as step 1	9A3TB1-13	Same as step 8	0 vac

NOTE: For steps 17 through 42 RF POWER meter 9A3M3 will be indicating and HEATER FLOW indicator lamp 9A3DS2 will be lit.

17	A, B, C, D, E	Same as step 1	9A3TB1-3	With MAIN POWER circuit breaker set to ON, adjust D. L. FLOW gate valve for 5 gallons per minute liquid coolant flow and close the HEATER FLOW gate valve. Set POSITION 1 - POSITION 2 coaxial switch 9A1S1 of dummy loads A and B to POSITION 2. (For dummy load E: when calibrating power amplifier #1 set coaxial switch 9A1S1 to POSITION 2, and switches 9A1S2 and 9A1S3 to POSITION 1; when calibrating power amplifier #2 set coaxial switch 9A1S1 to POSITION 1, and switches 9A1S2 and 9A1S3 to POSITION 2.)	0 vac
18	A, B, C, D, E	Same as step 1	9A3TB1-4	Same as step 17	0 vac
19	A, B, C, D, E	Same as step 1	9A3TB1-7	Same as step 17	0 vac
20	A, B, C, D, E	Same as step 1	9A3TB1-8	Same as step 17	120 vac ± 6 v
21	A, B, C, D, E	Same as step 15	Between 9A3TB1-11 and 9A3TB1-12	Same as step 17	0 ohm (continuity)
22	A, B, C, D, E	Same as step 1	9A3TB1-13	Same as step 17	120 vac ± 6 v

Table 5-3. Dummy Load Performance Test Table (cont)

Step	Applicable to Dummy Load	Operation of Test Equipment	Point of Test	Control Settings and Operation of Equipment	Performance Standard
23	AB	Same as step 15	Between 9TB1-9 and 9TB1-10	Same as step 17	0 ohm (continuity)
24	A, B, C, D	Same as step 15	Between 9TB1-8 and 9TB1-9	Same as step 17	0 ohm (continuity)
25	E	Same as step 15	Between 9A3TB1-11 and 9A3TB1-12	Same as step 17	0 ohm (continuity)
26	E	Same as step 15	Between 9A3TB1-15 and 9A3TB1-16	Same as step 17	0 ohm (continuity)
27	E	Same as step 15	9TB1-17	Same as step 17	0 ohm (continuity)
28	E	Same as step 1	9TB1-16	Same as step 17	0 vac
29	E	Same as step 1	9TB1-10	Same as step 17	0 vac
30	E	Same as step 1	9TB1-9	Same as step 17	0 vac
31	E	Same as step 1	9TB1-6	Same as step 17	0 vac
32	E	Same as step 1	9TB1-12	Same as step 17	0 vac
33	E	Same as step 1	9TB1-7	Same as step 17	0 vac
34	E	Same as step 1	9TB1-5	Same as step 17	0 vac
35	E	Same as step 1	9TB1-14	Same as step 17	0 vac
36	E	Same as step 1	9TB1-8	Same as step 17	0 vac
37	E	Same as step 1	9TB1-15	Same as step 17	0 vac
38	E	Same as step 1	9TB1-11	Same as step 17	0 vac
39	E	Same as step 15	Between 9TB1-5 and 9TB1-6	Same as step 17	0 ohm (continuity)
NOTE: Step 40 is applicable only when power amplifier #1 is being calibrated.					
40	E	Same as step 15	9TB1-13	Same as step 17	0 ohm (continuity)
NOTE: Step 41 is applicable only when power amplifier #2 is being calibrated.					
41	E	Same as step 15	Between 9TB1-7 and 9TB1-8	Same as step 17	0 ohm (continuity)
42	E	Same as step 15	9TB1-16	Same as step 17	0 ohm (continuity)

SECTION II

SPECIAL MAINTENANCE

5-18. SCOPE.

5-19. This section contains data necessary for maintenance of the dummy load. The maintenance procedures presented in this section can only be accomplished when the equipment is not in operation; further, the procedures supplement the instructions given in Section I. In performing maintenance according to these instructions refer to repair parts appendix C and to figures 6-4, 6-5, and 6-6.

5-20. BENCH TEST SETUP.

5-21. Bench test setup procedures are not applicable for the dummy load.

5-22. PERFORMANCE TESTS.

5-23. Assembly performance tests are performed by testing in the dummy load after replacement.

5-24. COMPONENT REMOVAL AND REPLACEMENT PROCEDURES.

5-25. FLOW RATE METER 9A2M1.

5-26. REMOVAL. The flow rate meter removal procedure is as follows:

NOTE

Refer to figure 6-5, Plumbing Assembly.

a. Close the COOLANT IN and COOLANT OUT gate valves. Open the D. L. FLOW and HEATER FLOW gate valves.

b. Position a suitable container, to catch the draining liquid coolant, under the two tees at the low point in the plumbing assembly. Remove the plug from each tee and allow the liquid coolant to drain.

c. Disconnect the two unions connecting the flow rate meter into the plumbing assembly. Remove the flow rate meter from the dummy load.

5-27. REPLACEMENT. The replacement of the flow rate meter is the reverse of the removal procedure.

5-28. WATER LOAD 9A1E1.

NOTE

If the water load has been damaged, the rf transmission line sections may contain some liquid coolant. Before loosening the bolts, place a suitable container under the joints to catch any liquid coolant which may drain.

5-29. REMOVAL. The water load removal procedure is as follows:

NOTE

Refer to figure 6-5, Plumbing Assembly.

a. Remove the bolts, washers, and nuts holding the two bottom 3-1/8-inch rf transmission line section in the front and to the water load in the rear.

CAUTION

Do not apply any rotational force to these rf transmission line sections. Any rotational force can damage the water load.

b. Pull the bottom rf transmission line sections straight down to disconnect them from the vertical line and the water load.

- c. Remove the disconnected rf transmission line sections from the cabinet.

NOTE

There may be some leakage of liquid coolant at this point. Use a suitable container to catch as much coolant as possible.

- d. Loosen the two unions at the top of the water load.

- e. Remove the clamps supporting the water load and remove it from the cabinet.

- f. Tip the water load up and pour the liquid coolant from the water load into a suitable container.

5-30. REPLACEMENT. The replacement of the water load is the reverse of the removal procedure.

5-31. COAXIAL SWITCH 9A1S1.

NOTE

Coaxial switch 9A1S1 is contained only in dummy loads A and B.

5-32. REMOVAL. The removal procedure for the coaxial switch is as follows:

NOTE

Refer to figure 6-5, Plumbing Assembly.

- a. Perform steps a through c of paragraph 5-29.

- b. Loosen the clamps supporting the vertical rf transmission line section under the coaxial switch. Pull the line section straight down and remove it from the cabinet.

- c. Disconnect plug 9P1 from coaxial switch jack 9J1.

- d. Remove the bolts, washers, and nuts from the flange at the rear of the coaxial switch.

- e. Remove the bolts, washers, and nuts from the rf output connection at the top of the cabinet and disconnect the external rf transmission line section.

- f. Remove the four screws, flat washers, and nuts supporting the rf line section clamp at the top of the coaxial switch. Remove the two screws, flat washers, and lockwashers supporting the coaxial switch.

- g. Tilt the coaxial switch forward and remove it from the cabinet.

5-33. REPLACEMENT. The replacement of the switch is the reverse of the removal procedure.

5-34. LIQUID COOLANT HEATER 9A2HR1.

5-35. REMOVAL. The liquid coolant heater removal procedure is as follows:

- a. Perform steps a and b of paragraph 5-26.

- b. Disconnect the electrical connections from the liquid coolant heater. Mark them to insure proper connection when replacing the heater.

- c. Loosen the two unions at the liquid coolant heater. Remove the screws, flat washers, and lockwashers supporting the clamp holding the liquid coolant heater and remove the heater from the cabinet.

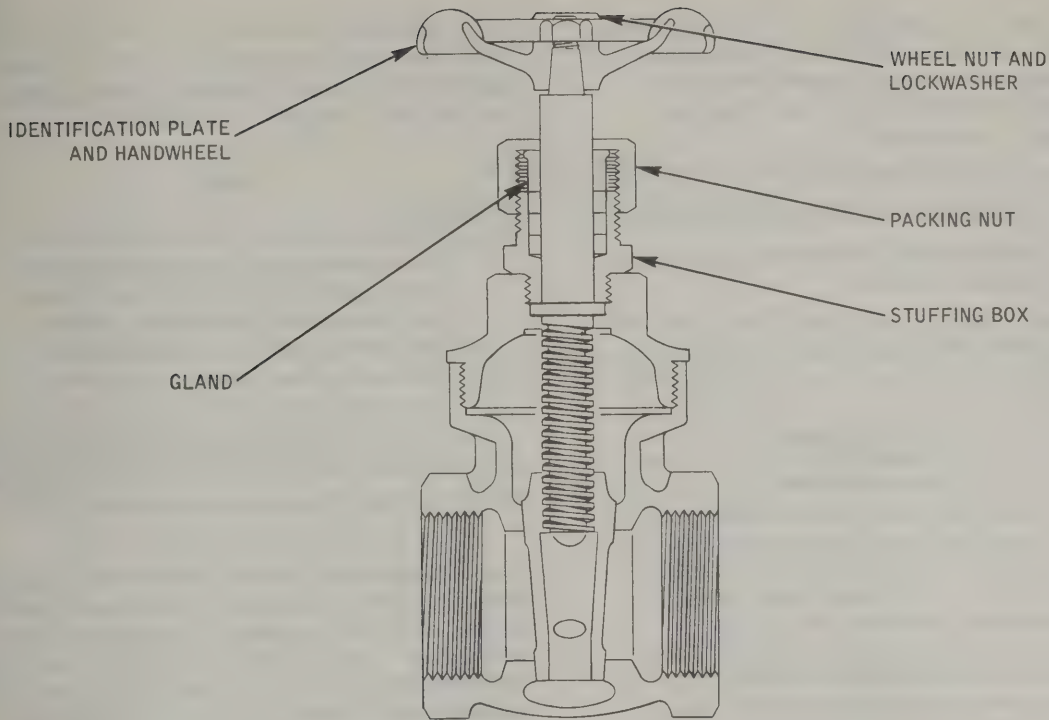
5-36. REPLACEMENT. The replacement of the liquid coolant heater is the reverse of the removal procedure.

5-37. MAINTENANCE OF GATE VALVES.

5-38. Any one of the four gate valves can be repacked while the dummy load is fully assembled, provided the valve to be repacked is fully opened. The valve need not be removed for repacking.

5-39. To repack a gate valve refer to figure 5-1 and proceed as follows:

- a. Fully open the gate valve.
- b. Remove the wheel nut and lockwasher.
- c. Remove the identification plate and the handwheel.
- d. Remove the packing nut.
- e. Remove the gland.
- f. Remove the packing from the stuffing box.



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Figure 5-1. Dummy Load Gate Valve

g. Repack the stuffing box with a suitable grade of high-quality packing.

h. Reassemble the valve by performing the reverse of steps a through e.

5-40. DISASSEMBLY AND REASSEMBLY OF SOLDERED COPPER PIPE JOINTS.

5-41. TOOLS REQUIRED.

5-42. The tools required for assembly and disassembly of soldered copper pipe joints are listed in table 5-4.

5-43. DISASSEMBLY OF SOLDERED JOINTS.

5-44. To disassemble a soldered copper pipe joint, proceed as follows:

a. Turn off the dummy load, following the procedures in Chapter 3.

b. Close all valves in the plumbing assembly.

c. Remove the drain plug from the plumbing subassembly containing the pipe joint to be disassembled. Collect the liquid coolant in a suitable container.

Table 5-4. Tools Required for Repair of Plumbing

Description	Qty
Torch, soldering, kit.....	1
Solder, solid core, 80% tin, 20% lead.....	*
Flux, soldering, paste, noncorrosive.....	*
Cloth, abrasive.....	*
Cutter, tube, sliding feed member type, 1/8 to 1 in. tube od cutting range.....	1
Pliers, gas, 8 in.	1
Reamer, hand, taper, T-handle, 1/8 in. dia small end, 1/2-in. dia large end, 3-1/2 in. nominal length of flute 5-1/2 in. overall length.....	1
Rags, wiping.....	*

*As required

NOTE

Insure that no liquid coolant remains in the plumbing subassembly being disassembled, so that the temperature of the joint will rise enough to melt the solder in the joint when heated.

d. Ignite the soldering torch and carefully heat the joint. When the joint is hot enough to melt the solder inside, draw the two sections of the joint apart using pliers and a wiping rag if necessary.

e. Wipe off the excess solder with the rag.

5-45. REASSEMBLY OF SOLDERED JOINTS.

5-46. To reassemble a soldered copper pipe joint, proceed as follows:

a. Using a strip of abrasive cloth, carefully clean the male end of the joint, and, if possible, the female end.

CAUTION

If installing a replacement part which has not been previously soldered, clean the part of the surface which is to be soldered with a strip of abrasive cloth until all of the oxide coating is removed and bright shiny metal appears. Heat the surface and coat it uniformly with solder before proceeding.

b. Assemble the two parts of the joint and heat the female end with the soldering torch until a bit of solder just barely melts when touched to the edge of the joint.

NOTE

If the two parts of the joint will not fit together (one should go at least half an inch inside the other), heat each piece until the solder melts and wipe away the excess solder with a brush or rag.

c. Apply solder sparingly at the joint to the outer surface of the male end, while maintaining a moderate temperature with the torch.

d. Remove the torch and carefully apply a bead of solder at the joint, to the outer surface of the male end, so that a shoulder builds up and forms a watertight seal. Apply the torch flame to the joint as necessary to prevent the temperature of the joint from dropping below the solder melting point.

CHAPTER 6 CIRCUIT DIAGRAMS

6-1. PURPOSE. This chapter illustrates by schematic diagrams all component circuits of the dummy load. The circuit diagrams are provided to help you better understand the equipment and are to be used as an aid in troubleshooting.

6-2. SCOPE. This chapter provides schematics pertaining to each of the dummy loads

Dummy Load Wiring List

NOTE: In addition to the wiring list given here, the Chapter 2 interconnecting cabling must be installed to reflect the connections of the schematic diagram for dummy load E. Unless otherwise noted all wire is AWG No. 20

From—	To—	Wire Color and Size
9TB1-1	9A3TB1-1	AWG No. 16 wht/gy/yel
9TB1-2	9A3TB1-14	AWG No. 16 wht/gy/red
9TB1-3	9A3TB1-6	AWG No. 16 wht/blk/blk
9TB1-4	GRD stud	AWG No. 16 wht/blk
9TB1-8*	9A3TB1-11	Wht/wht/brn
9TB1-9*	9A3TB1-12	Wht/wht
9A3TB1-1	9A3CB1-4	AWG No. 16 wht/gy/yel
9A3TB1-2	9A3CB1-3	AWG No. 16 wht/gy/yel
9A3TB1-3	9A3M2-(+)	AWG No. 16 wht/brn/yel
9A3TB1-4	9A3M2	AWG No. 16 wht/brn/gy
9A3TB1-5	9A3M1	AWG No. 16 wht/gy/blk
9A3TB1-5	9A3CB1-2	AWG No. 16 wht/gy/red

described and discussed in this manual. Refer to the pertinent schematic diagram when performing any maintenance procedures or following any discussion on the theory of operation. Also included are parts location diagrams keyed to appendixes A and C.

6-3. WIRING LIST. A wiring list which gives intraconnecting cabling information is included in this chapter.

Dummy Load Wiring List (cont)

From—	To—	Wire Color and Size
9A3TB1-6	9A3DS3	AWG No. 18 wht/blk/blk
9A3TB1-6	9A3DS2	AWG No. 18 wht/blk/blk
9A3TB1-7	9A3DS3-(+)	AWG No. 18 wht/gy/blu
9A3TB1-8	9A3K1-2	Wht/gy/grn
9A3TB1-9	9A3R2-3	Wht/red/brn
9A3TB1-10	9A3M3-2	Wht/vio
9A3TB1-11	9A3K1-5	Wht/wht
9A3TB1-12	9A3K1-4	Wht/wht
9A3TB1-13	9A3DS2-(+)	AWG No. 18 wht/brn/red
9A3TB1-14	9A3CB1-1	AWG No. 16 wht/gy/red
9A3M3-1	9A3R2-1	Wht/red
9A3K1-1	9A3DS3	Wht/wht/blk
9A3M2-(+)	9A3M1-(+)	Wht/brn/orn
9A3DS1-(+)	9A3CB1-4	AWG No. 16 wht/gy
9A3R3	9A3M1	AWG No. 16 wht/gy/blk
9A2HR1-1	9A3TB1-4	AWG No. 16 wht/grn/gy
9A2HR1-2	9A3TB1-5	AWG No. 16 wht/gy/red
9A2S1-NC	9A3TB1-3	Wht/brn/yel

*Not applicable to Dummy Load E

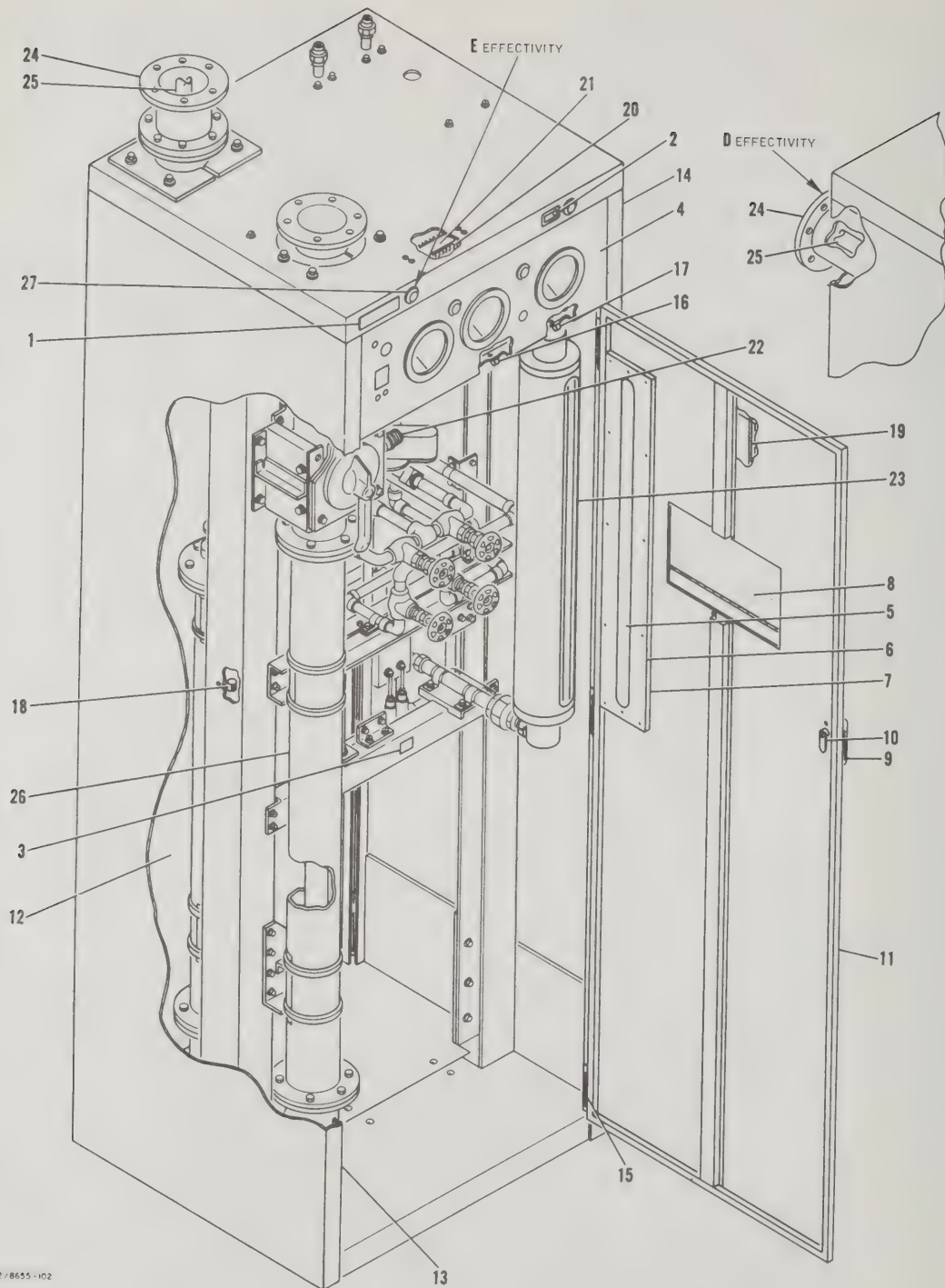
Dummy Load Wiring List (cont)

From--	To--	Wire Color and Size
9A2S1-NO	9A3TB1-13	AWG No. 16 wht/brn/red
9A2S1-C	9A3TB1-1	Wht/gy/yel
9A2E1-(-)	9A3TB1-10	Wht/vio
9A2E1-(+)	9A3TB1-9	Wht/red/brn
9A2S2-C	9A3TB1-1	Wht/gy
9A2S2-NO	9A3TB1-7	Wht/gy/blk
9A2S2-NC	9A3TB1-8	Wht/gy/grn

Dummy Load Wiring List (cont)

From--	To--	Wire Color and Size
9TB1-8**	9P1-F	Wht/wht/brn
9TB1-9**	9P1-A	Wht/wht
9TB1-10**	9P1-B and 9P1-G	Wht/vio
9TB1-11**	9P1-D	Wht/grn
9TB1-12**	9P1-E	Wht/yel

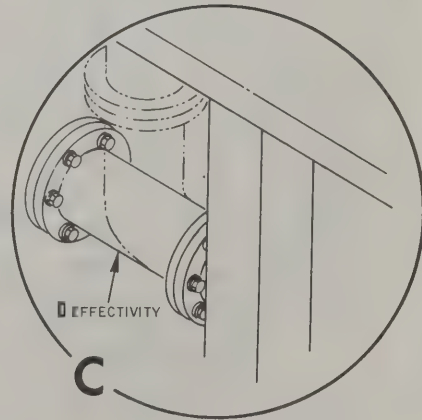
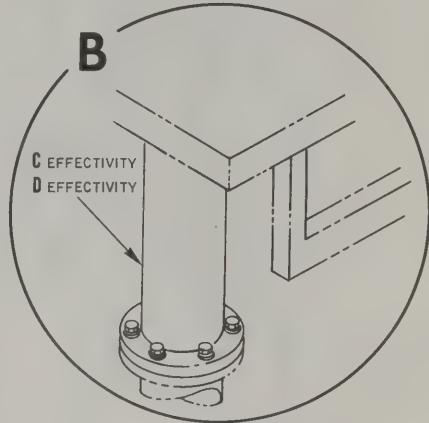
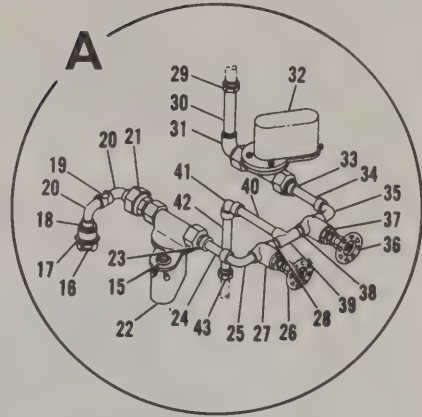
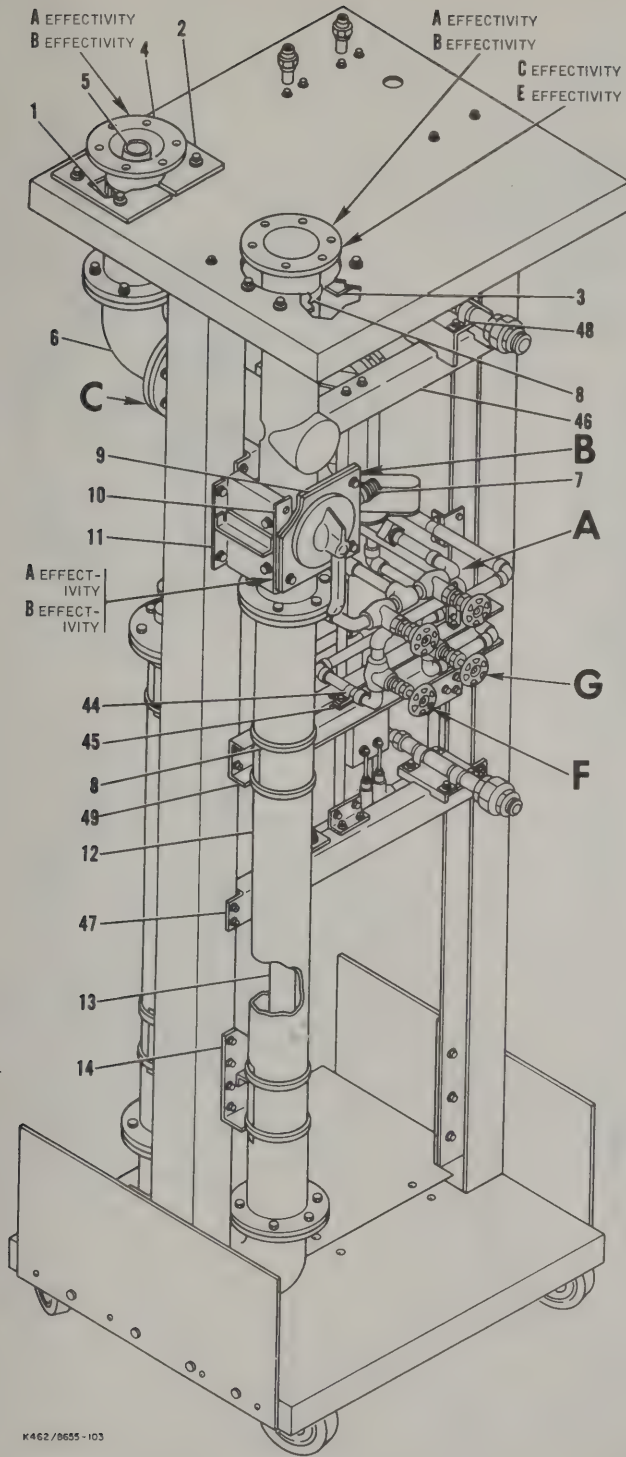
**Applicable to dummy loads A and B only



K462/8655-102

Figure 6-4.

Calorimeter



K462/0655-103

Figure 6-5.

Plumbing Assembly (Sheet 1 of 3)

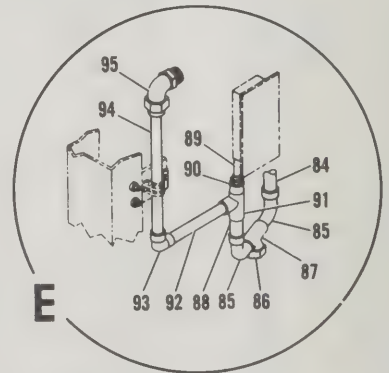
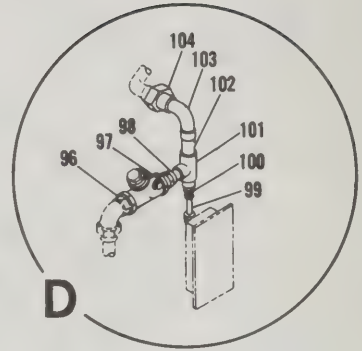
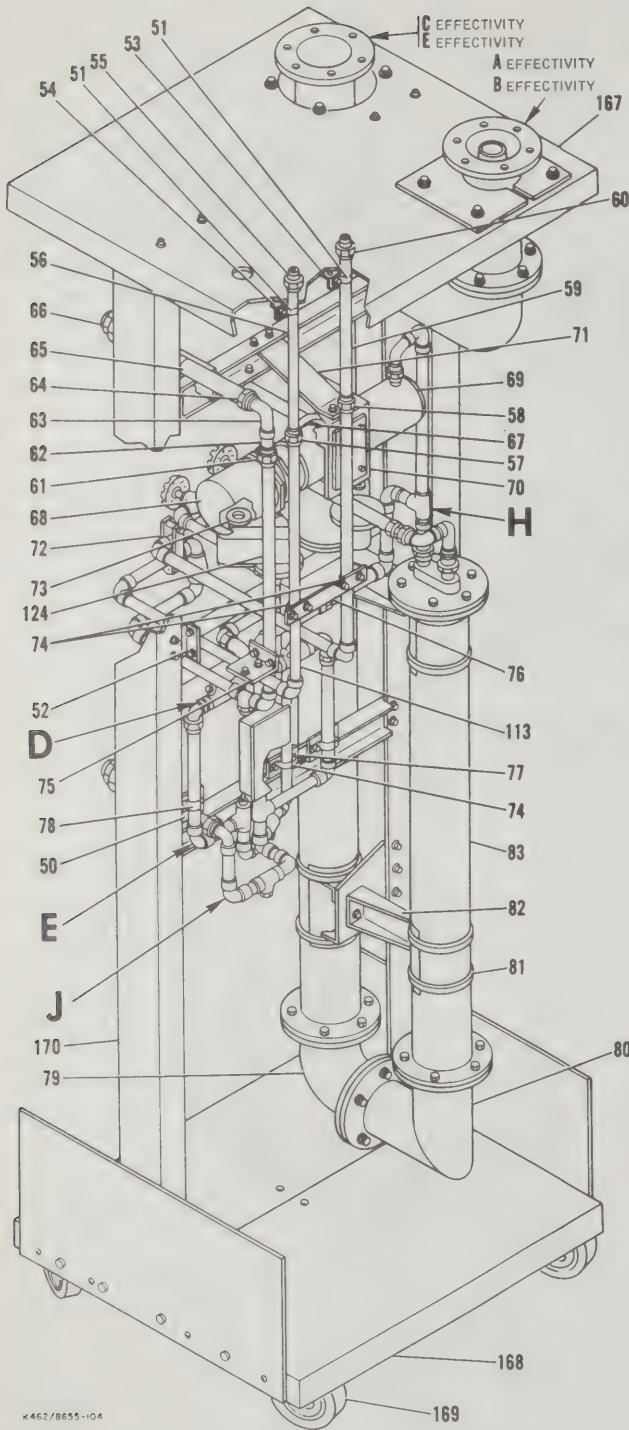


Figure 6-5. Plumbing Assembly (Sheet 2 of 3)

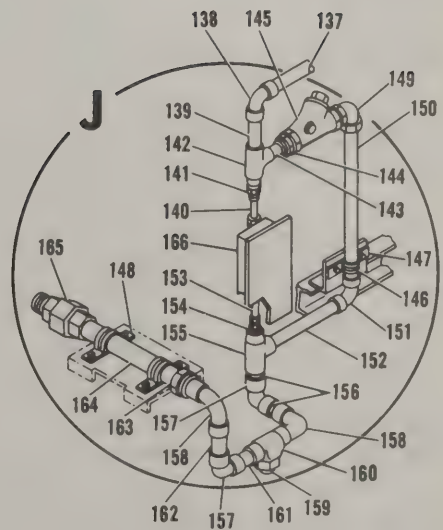
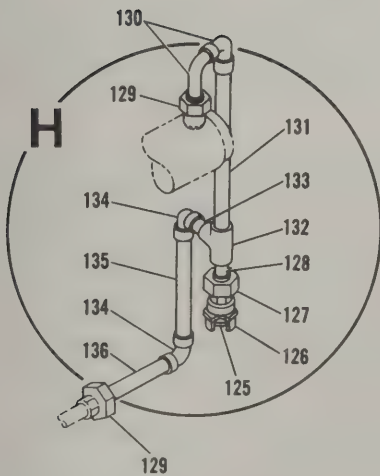
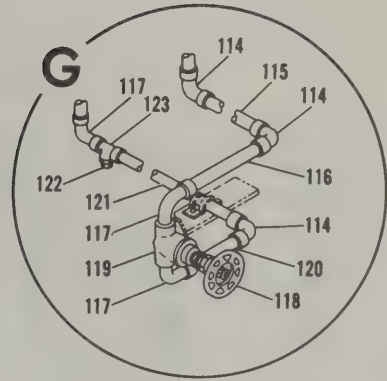
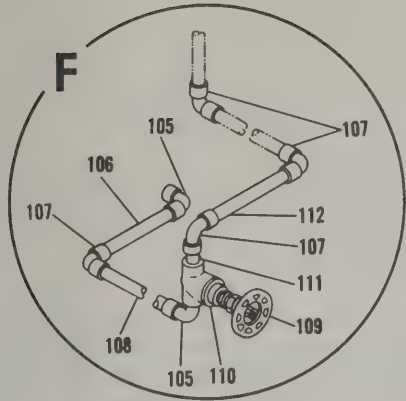
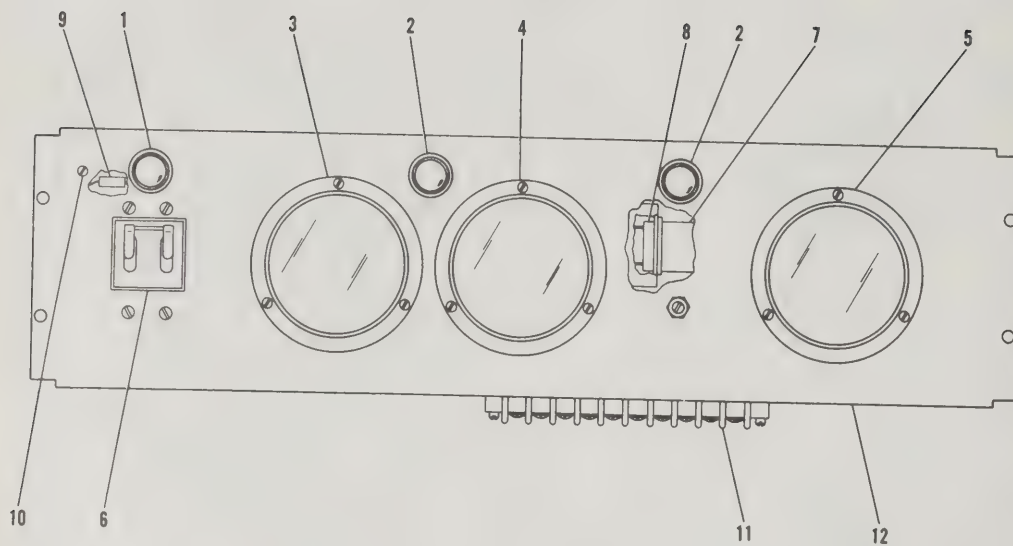


Figure 6-5. Plumbing Assembly (Sheet 3 of 3)



J462/8655-106

Figure 6-6. Indicator Panel

APPENDIX A

BASIC ISSUE ITEMS

Section I. INTRODUCTION

A-1. Scope

This appendix lists items comprising an operable equipment and those required for installation, operation, or operator's maintenance for Calorimeter DA-272/FRC-39A(V).

A-2. Explanation of Columns

The following is a list of explanations of columns in section II.

a. Source, Maintenance, and Recoverability Codes (ABC) Column.

(1) *Source code (A).* The selection status and source for the listed item is the first code indicated in this column. The source codes used and their explanations are—

Code	Explanation
P --	Applies to repair parts that are stocked in or supplied from GSA/DSA, or Army supply system, and authorized for use at indicated maintenance categories.
A --	Applies to assemblies that are not procured or stocked as such but are made up of two or more units, each of which carries an individual stock number and description and is procured and stocked and can be assembled by units at indicated maintenance categories.

(2) *Maintenance code (B).* The lowest category of maintenance authorized to install the item is indicated by the second code in the column. The maintenance category code and its explanation is—

Code	Explanation
O --	Organizational Maintenance

(3) *Recoverability code (C).* The recoverability code is the third code in the column. It indicates whether unserviceable items should be returned for recovery or salvage. Recoverability code and its explanation is as follows:

Note. When no code is indicated in the recoverability column, the part will be considered expendable.

Code	Explanation
R --	Applies to repair parts and assemblies that are economically repairable at DSU and GSU activities and are normally furnished by supply on an exchange basis.

b. Federal Stock Number Column. This column indicates the Federal stock number for the item.

c. Description Column. This column includes the Federal item name and any additional description of the item which may be required. A five-digit Federal supply code for manufacturers is followed by a part number or other reference number. The model column is not used.

d. Unit of Issue Column. The unit used as a basis of issue, (e.g., ea, pr, ft, yd, etc.) is given in this column.

e. Quantity Incorporated in Unit Pack Column. Not used.

f. Quantity Incorporated in Unit Column. The total quantity of the item used in the equipment is given in this column.

g. Quantity Authorized Column. This column lists the quantity of the item supplied for initial operation of the equipment and/or the quantities authorized to be kept on hand by the operator for maintenance of the equipment.

h. Illustration Column.

(1) *Figure number (A).* The number of the illustration on which the item is shown is indicated in this column.

(2) *Item or symbol number (B).* The item or symbol number used to reference the item on the illustration appears in this column.

Section II. BASIC ISSUE ITEMS

BASIC ISSUE ITEMS LIST									
(A) SOURCE CD	(B) MAINT. CD	(C) REC. CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION					
				MODEL					
				1	2	3	4	5	6
A	O	R							
				CALORIMETER DA-272/FRC-19A(V): 77633; 957 (This item is nonexpendable)					
				TECHNICAL MANUAL TM 11-5820-756-15					
				Requisition through pinpoint account number if assigned; otherwise through nearest Adjutant General facility.					
				NOTE: For technical manuals the quantity indicates the maximum number of copies authorized for packing (for issue) with the equipment. Where a number of these equipment are concentrated in a small area, the quantity on hand may be reduced to the minimum actual requirements as determined by the Commanding officer of the unit.					
P	O		6240-233-9100						
				LAMP, GLOW: 24446; NE51					
				NO ACCESSORIES, TOOLS OR TEST EQUIPMENT ARE TO BE ISSUED WITH THIS EQUIPMENT					
				NO BASIC ISSUE ITEMS ARE MOUNTED IN OR ON THE EQUIPMENT					
				ea					
				ea					
				6-4					
				6-6					
				2					

APPENDIX B

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

B-1. General

This appendix provides a summary of the maintenance operations covered in the equipment literature for Calorimeter DA-272/FRC-39A(V). It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

B-2. Explanation of Format for Maintenance Allocation Chart

a. Group Number. Group numbers correspond to the reference designation prefix assigned in accordance with ASA Y32.16, Electrical and Electronics Reference Designations. They indicate the relation of listed items to the next higher assembly.

b. Component Assembly Nomenclature. This column lists the item names of component units, assemblies, subassemblies, and modules on which maintenance is authorized.

c. Maintenance Function. This column indicates the maintenance category at which performance of the specific maintenance function is authorized. Authorization to perform a function at any category also includes authorization to perform that function at higher categories. The codes used represent the various maintenance categories as follows:

Code	Maintenance category
C --	Operator/Crew
O --	Organizational Maintenance
F --	Direct Support Maintenance
H --	General Support Maintenance
D --	Depot Maintenance

d. Tools and Equipment. The numbers appearing in this column refer to specific tools and equipment which are identified by these numbers in section III.

e. Remarks. Self-explanatory.

B-3. Explanation of Format for Tool and Test Equipment Requirements

The columns in the tool and test equipment requirements chart are as follows:

a. Tools and Equipment. The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool for the maintenance function.

b. Maintenance Category. The codes in this column indicate the maintenance category normally allocated the facility.

c. Nomenclature. This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

d. Federal Stock Number. This column lists the Federal stock number.

e. Tool Number. Not used.

SECTION II. MAINTENANCE ALLOCATION CHART

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS										TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD	
1	VALVE, INLET DA-77/PW-30A, W TYPE 077	O	O										External Internal Check voltage & continuity Voltage level, resistance & continuity Refer to procedures; Replace lamps; Replace defective parts Restore to serviceable condition
1A	PANEL, INDICATOR ALCOA-DANA	O											Visual Check voltage & continuity Replace lamps Replace defective parts

SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	FEDERAL STOCK NUMBER	TOOL NUMBER
1	O, F, H	DA-272/FRC-39A/W (Cont.)	6605-057-4374 5180-064-5178 5180-605-0079 5180-610-8177	
2	O	MULTIMETER AM/PSM-6B		
3	F, H	TOOL KIT, ELECTRONIC EQUIPMENT TKL01/G		
4	F, H	TOOL KIT, ELECTRONIC EQUIPMENT TKL00/G OR TOOL KIT, ELECTRONIC EQUIPMENT TKL05/G		

APPENDIX C

ORGANIZATIONAL, DS, GS, AND DEPOT REPAIR PARTS

Section I. INTRODUCTION

C-1. Scope

This appendix contains a list of repair parts required for the performance of organizational maintenance and a list covering the corresponding requirements for direct support, general support, and depot maintenance for Calorimeter DA-272/FRC-39A(V).

Note. No special tools, test and support equipment are required.

C-2. General

The repair parts list is divided into the following sections:

a. Prescribed Load Allowance (PLA), Section II. The PLA is a consolidated listing of repair parts allocated for initial stockage at organizational maintenance category. This is a mandatory minimum stockage allowance.

b. Repair Parts for Organizational Maintenance, Section III. Repair parts authorized for organizational maintenance are included in this section.

c. Repair Parts for Direct Support, General Support and Depot Maintenance, Section IV. Repair parts authorized for direct support, general support, and depot maintenance are included in this section.

Note. All indexes noted below are cross-referenced to index numbers. The index numbers appear in ascending sequence in column 3 of the repair parts list (para C-3c). The index number for the particular item will be the same for the item in all sections of this appendix.

d. Federal Stock Number Cross Reference to Index Number, Section V. This is a cross reference index of Federal stock numbers and manufacturer's part numbers to index numbers.

e. Figure and Item Number Cross Reference to Index Number, Section VI. This is a cross reference index of figure number and item number to index number. The figure numbers are listed in numerical sequence; item numbers are listed for each figure.

C-3. Explanation of Columns

An explanation of the columns is given below.

a. Source, Maintenance, and Recoverability Codes (ABC). This column lists the applicable SMR codes for the part.

(1) *Source code (A).* The selection status and source for the listed item is noted here. Source codes and their explanations are as follows:

Code	Explanation
P --	Applies to repair parts that are stocked in or supplied from the GSA/DSA, or Army supply system, and authorized for use at indicated maintenance categories.
M --	Applies to repair parts that are not procured or stocked but are to be manufactured at indicated maintenance categories.
A --	Applies to assemblies that are not procured or stocked as such but are made up of two or more units, each of which carries an individual stock number and description and is procured and stocked and can be assembled by units at indicated maintenance categories.
X1 --	Applies to repair parts that are not procured or stocked, the requirement for which will be supplied by the use of next higher assembly or component.
X2 --	Applies to repair parts that are not stocked. The indicated maintenance category requiring such repair parts will attempt to obtain them through cannibalization; if not obtainable through cannibalization, such repair parts will be requisitioned with supporting justification through normal supply channels.
C --	Applies to repair parts authorized for local procurement. If not obtainable from local procurement, such repair parts will be requisitioned through normal supply channels with a supporting statement of nonavailability from local procurement.

(2) *Maintenance code (B).* The lowest category of maintenance authorized to install the listed item is noted here.

Code	Explanation
O --	Organizational Maintenance
F --	Direct Support Maintenance
H --	General Support Maintenance

(3) *Recoverability code (C)*. The information in this column indicates whether unserviceable items should be returned for recovery or salvage. Recoverability code and its explanation is as follows:

Note. When no code is indicated in the recoverability column, the part will be considered expendable.

Code	Explanation
R --	Applies to repair parts and assemblies which are economically repairable at DSU and GSU activities and normally are furnished by supply on an exchange basis.

b. Federal Stock Number Column. The Federal stock number for the item is listed in this column.

c. Description Column. The index number, Federal item name, a five-digit manufacturer's code, an indenture code, and a part number are included in this column. For subsequent appearances of the same item, the manufacturer's code and part number are omitted. The words "same as" followed by the index number assigned to the item when it first appeared in the list will follow the item name, e.g., "RESISTOR, FIXED, COMPOSITION: SAME AS A298." The indenture codes indicate the end item, the assemblies, and the component parts. Identical codes are parts of the preceding higher code. An asterisk (*) identifies attaching hardware. The model column is not used.

d. Unit of Issue Column. The unit used as a basis of issue (e.g., ea, pr, ft, yd, etc.) is indicated in this column.

e. Quantity Incorporated in Unit Pack Column. Not used.

f. Quantity Incorporated in Unit Column. The quantity of repair parts in an assembly is given in this column. Subsequent appearances of the same item in the same assembly are indicated by the letters "REF."

g. Maintenance Allowances Column.

(1) The maintenance allowance columns are divided into subcolumns. Indicated in each subcolumn opposite the first appearance of the item is the total quantity of items authorized for the number of equipments supported. Subsequent appearances of the same item will have no entry in the allowance columns, but will have a reference in the description column to the first appearance of the item. Items authorized for use as required, but not for initial stockage, are identified with an asterisk (*) in the allowance column.

(2) The quantitative allowances for organizational category of maintenance represents one

initial prescribed load for a 15-day period for the number of equipments supported. Units and organizations authorized additional prescribed loads will multiply the number of prescribed loads authorized by the quantity of repair parts reflected in the appropriate density column to obtain the total quantity of repair parts authorized.

(3) Subsequent changes to organizational allowances will be limited as follows: No change in the range of items is authorized. If additional items are considered necessary, recommendations should be forwarded to Commanding General, U. S. Army Electronics Command, ATTN: AMSEL-ME-NMP-C, Fort Monmouth, N.J. 07703, for exception or revision to the allowance list. Revisions to the range of items authorized will be made by the USA ECOM National Maintenance Point based upon engineering experience, demand data, or TAERS information.

(4) The quantitative allowances for DS/GS categories of maintenance will represent initial stockage for a 30-day period for the number of equipments supported.

h. One-Year Allowances Per 100 Equipments/Contingency Planning Purposed Column. Opposite the first appearance of each item, the total quantity required for distribution and contingency planning purposes is indicated. The range of items indicates total quantities of all authorized items required to provide for adequate support of 100 equipments for one year.

i. Depot Maintenance Allowance Per 100 Equipments Column. This column indicates the total quantity of each item authorized depot maintenance for 100 equipments. Subsequent appearances of the same item will have no entry in this column, but will have a reference in the description column, to the first appearance of the item.

C-4. Location of Repair Parts

a. This appendix contains two cross-reference indexes (secs. V and VI), to be used to locate a repair part when either the Federal stock number, reference number (manufacturer's part number), or figure number is known. The first column in each cross-reference index is prepared, as applicable, in numerical or alphanumerical sequence. The last column of each cross-reference index lists the index number assigned to the part.

b. Refer to the appropriate cross-reference index (para C-2d, e) and note the index number in the last column; then refer to the repair parts list to locate the index number which is listed in

ascending order in column 3 of the repair parts list.

C-5. Federal Supply Codes

This paragraph lists the Federal supply code with the associated manufacturer's name.

Code	Manufacturer
06980 ----	Eitel-McCullough, Inc.
08484 ----	Breeze Corporations, Inc.
11699 ----	Chase Brass & Copper Co., Inc.
24446 ----	General Electric Co.
37942 ----	Mallory PR & Co., Inc.
42689 ----	National Lock Co.
63686 ----	Walworth Co.
65092 ----	Weston Instruments, Inc.

Code	Manufacturer
74193 ----	Heinemann Electric Co.
77633 ----	Radio Engineering Laboratories
81349 ----	Military Specifications
82436 ----	Baldwin Beeting, Inc.
84971 ----	TA Mfg. Corp.
87541 ----	Stanley Hardware Co., Inc.
88044 ----	Aeronautical Standards Group, Dept of Navy and Air Force
88223 ----	Jaymar Terminal Boards, Inc.
90800 ----	Hays Mfg. Co.
94661 ----	Prodelin, Inc.
95987 ----	Weckesser Co.
96906 ----	Military Standards
97076 ----	New York Brass Foundry Co.
99699 ----	Filtors, Inc. Div of the Deutsch Co. Electronics Component

PRESCRIBED LOAD ALLOWANCE					
1 FEDERAL STOCK NUMBER	2 DESCRIPTION	3 15-DAY ORG MAINT. ALLOWANCE			
		4	5	6	7 QTY INC IN UN PK
		1-5	6-20	21-50	
6240-223-9100	X03310: LAMP, GLOW: 24446; NE51	*	2	2	3

SECTION III. REPAIR PARTS FOR ORGANIZATIONAL MAINTENANCE

REPAIR PARTS FOR ORGANIZATIONAL MAINTENANCE									
(1)		(2)		(3)					
SOURCE CD	MAINT. CD	REC. CODE	FEDERAL STOCK NUMBER	DESCRIPTION					
			MODEL						
			1	2	3	4	5	6	
A	O	R							
P	O		6240-223-9100	X00010	CALORIMETER DA-272/FRG-39A(V): 77633; 957 (This item is non-expendable)				
				X03310:	LAMP, GLOW: 24446; NE51				

SECTION IV. REPAIR PARTS FOR DS, MS, AND DEPOT MAINTENANCE

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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SOURCE CD	(A)	MAINT. CD	(B)	(C)	REC. CODE	FEDERAL STOCK NUMBER	MODEL						UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UN UNIT	30 DAY MAINT. ALW.						1 YR. ALW. PER 100 EQUIP.	DEPOT MAINT. ALW. PER 100 EQUIP.	FIGURE NUMBER	(A)	(B)	ITEM OR SYMBOL NUMBER																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																											
(1)	(A)	(B)	(C)	(2)	(3)						(4)	(5)	(6)	(7)					(8)	(9)	(10)						
SOURCE CD	MAINT. CD	REC. CODE	FEDERAL STOCK NUMBER		MODEL						IND. CD	UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UN	30 DAY MAINT. ALW.	1 YR. ALW.					PER 100 EQUIP.	CATG Y PL.	DEPOT MAINT. ALW. PER 100 EQUIP.	FIGURE NUMBER	ITEM OR SYMBOL NUMBER	ILLUSTRATION	
					1	2	3	4	5	6						DS	(A)	(B)	(C)	GS							(A)
X2	F									B	X00140 DOOR, ACCESS 77633 A1902-OA004														6-4	11	
C	F									*	X00150 SCREW, MACHINE 77633 CPPI902B001BC35																
C	F									*	X00160 NUT, PLAIN PLATE 77633 S1902-OA027																
X2	F									C	X00170 WINDOW, OBSERVATION 77633 S1902-OA018																
C	F									C	X00180 GASKET, RUBBER 77633 S1902-OA019															6-4	6
X2	F									C	X00190 RETAINER, WINDOW 77633 S1902-OA020															6-4	7
C	F									*	X00200 SCREW, MACHINE 77633 CPPI903D001BC6-6																
C	F									*	X00210 WASHER 88044 AN936A6																
X2	F									C	X00220 DOOR, ACCESS 77633 M1902-OA013															6-4	8
C	F									*	X00230 SCREW, MACHINE SAME AS X00200																
C	F									*	X00240 WASHER SAME AS X00210																

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																											
(1)		(2)		(3)						(4)	(5)	(6)	(7)						(8)	(9)	(10)						
SOURCE CD	(A)	(B)	(C)	FEDERAL STOCK NUMBER	MODEL						DESCRIPTION	UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UNIT	30 DAY MAINT. ALW.						1 YR. ALW. PER 100 EQUIP.	DEPOT MAINT. ALW. PER 100 EQUIP.	ILLUSTRATION				
					1	2	3	4	5	6					IND CD	(A)	(B)	(C)	(A)	(B)			(C)	(A)	(B)		
C	F			5340-770-3814							* X00250 NUT 96906 MS35649			3												6-4	9
X2	F										C X00260 LATCH, HANDLE 42689 68-081CCW			2												6-4	10
X2	F										C X00270 LATCH, PLATE 42689 61-082-10			2												6-4	11
X2	F										C X00280 DOOR, ACCESS 77633 M1902-0A004			1												6-4	
X2	F										B X00290 DOOR, ACCESS 77633 M1902-0A009			1												6-4	
C	F										* X00300 SCREW, MACHINE SAME AS X00150		REF														
C	F										* X00310 NUT, PLAIN PLATE SAME AS X00160		REF														
X2	F			5340-770-3814							C X00320 LATCH, HANDLE SAME AS X00260		REF													6-4	
X2	F										C X00330 LATCH, PLATE SAME AS X00270		REF													6-4	
X2	F										C X00340 DOOR, ACCESS 77633 M1902-0A009-1		1													6-4	12
X2	F										B X00350 COVER 77633 S1902-0B023		1													6-4	13

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE											(10)											
(1)	(2)	(3)						(4)	(5)	(6)	(7)			(8)	(9)	(10)						
SOURCE CD	MAINT. CD	REC. CODE	FEDERAL STOCK NUMBER	MODEL						IND. CD	DESCRIPTION	UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UN	30 DAY MAINT. ALW.			PER 100 EQUIP. CNTG CY PL.	DEPOT MAINT. ALW. PER 100 EQUIP.	ILLUSTRATION		
				1	2	3	4	5	6						DS	GS	FIGURE NUMBER (A)			ITEM OR SYMBOL NUMBER (B)		
X2 F									B	X00360 COVER 77633 SI1902-08026		1									6-4	14
C F									*	X00370 SCREW, MACHINE 77633 CP1903D0018C8-8		12										
C F									*	X00380 SCREW, MACHINE SAME AS X00110		REF										
C F									*	X00390 SCREW, MACHINE 77633 CP1903D0018C10-8		96										
C F									*	X00400 WASHER, FLAT 77633 CPP2107D001C88		92										
C F									*	X00410 WASHER, FLAT 77633 CPP2107D001C810		80										
C F		5310-576-0546							*	X00420 WASHER 96906 MS35338-99		100										
C F		5310-261-8278							*	X00430 WASHER 96906 MS35338-100		100										
C F		5310-184-8977							*	X00440 WASHER SAME AS X00130		REF										
C F									*	X00450 NUT, PLAIN HEX. 77633 CPP2025B001-65C		30										
X2 F									B	X00460 HINGE, BUTT 87541 HT295CMD		6									6-4	15

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																							
(1)	(A) SOURCE CD	(B)(C) MAINT. CD	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION						(4) UNIT OF ISSUE	(5) QTY INC IN UN PK	(6) QTY INC IN UNIT	(7) 30 DAY MAINT. ALW.						(8) PER 100 EQUIP.	(9) DEPOT MAINT. ALW. PER 100 EQUIP.	(10) ILLUSTRATION		
				MODEL									DS						GS			(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER
				1	2	3	4	5	6				(A)	(B)	(C)	(A)	(B)	(C)					
X2	F									B	X00580 TERMINAL BOARD 88223 442-14MME										6-4	21	
C	F									*	X00590 SCREW, MACHINE 77633 CPP190300018C10-14												
C	F									*	X00600 WASHER, FLAT SAME AS X00410	REF											
C	F		5310-261-8278							*	X00610 WASHER SAME AS X00430	REF											
C	F									*	X00620 NUT, PLAIN HEX. 77633 CPP20258001-105C	20											
H	H									B	X00630 WIRING HARNESS, BRANCHED 77633 HL902-0A002	1									6-4		
P	F		5935-195-8967							C	X00640 CONNECTOR 96906 MS3108A18-1S	1	*	*	*	*	*	*			6-4	22	
P	F									B	X00650 METER, FLOW RATE INDICATING, FLOAT TYPE 77633 CPP20188001	1	*	*	2	*	*	2			6-4	23	
X2	F									B	X00660 LINE, RF TRANSMISSION 77633 M1972-0A007-3	1									6-4	24	
X2	F									B	X00670 CONDUCTOR ASSEMBLY 77633 A1902-0A005	1									6-4	25	

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE															(10)			
(1) SOURCE CD	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION						(4) UNIT OF ISSUE	(5) QTY INC IN UN PK	(6) QTY INC IN UNIT	(7) 30 DAY MAINT. ALW.			(8) PER 100 EQUIP.	(9) DEPOT MAINT. ALW. PER 100 EQUIP.	(10) ILLUSTRATION		
		MODEL									DS					GS		
		1	2	3	4	5	6				(A) 1-20	(B) 21-50	(C) 51-100	(A) 1-20	(B) 21-50	(C) 51-100		
A	F							B	X00680 PLUMBING ASSEMBLY 77633 A1902-0A003	1							6-4	26
A	F							B	X00710 PLUMBING ASSEMBLY SAME AS X00680	REF							6-5	
X2	F							C	X00720 CLAMP, HOSE 08484 Q5200M48S	36							6-5	1
X2	F							C	X00730 CLAMP, LINE SECTION 77633 M1902-0A012	2							6-5	2
X2	F							C	X00740 CLAMP, LINE SECTION 77633 M1902-0B016	2							6-5	3
C	F							*	X00750 SCREW, MACHINE 77633 CPP2155A001-8	16								
C	F							*	X00760 WASHER, FLAT 77633 CPP2107D001CB416	28								
C	F							*	X00770 WASHER 96906 MS35338-101	28								
C	F							*	X00780 NUT, PLAIN HEX. 77633 CPP2025B001-411C	20								
X2	F							C	X00790 LINE, RF TRANSMISSION 77633 M1902-0B014-2	2							6-5	4

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																								
(1) SOURCE CD	(A) (B) (C) MAINT. CD	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION						(4) UNIT OF ISSUE	(5) QTY INC IN UN PK	(6) QTY INC IN UN	(7) 30 DAY MAINT. ALW.									(8) 1 YR. ALW. PER 100 EQUIP.	(9) DEPOT MAINT. ALW. PER 100 EQUIP.	(10) ILLUSTRATION	
			MODEL									DS			GS			CS					(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER
X2 F			C	X00820 LINE, RF TRANSMISSION 77633 S1902-0B042-2						2											6-5	5		
X2 F		5985-044-5942	C	X00840 LINE, RF TRANSMISSION 94661 485-835						4												6-5	6	
P F		5935-193-3550	C	X00850 CONNECTOR 96906 MS3102A18-1P						2	*	*	*	*	*	*	*	*	5			6-5	7	
C F			*	X00860 SCREW, MACHINE 77633 CPP1903D001BC4-6						8													8	
X2 F			A	X00870 CLAMP, HOSE SAME AS X00720						REF												6-5		
P F			C	X00880 SWITCH, COAXIAL 77633 CPP2019B001						2	*	*	2	*	*	*	2	13	6			6-5	9	
C F			*	X00900 SCREW, MACHINE 77633 CPP2155A001-20						4														
C F			*	X00910 WASHER, FLAT SAME AS X00760						REF														
C F		5310-184-8970	*	X00920 WASHER SAME AS X00770						REF														
X2 F			C	X00930 BRACKET, ANGLE 77633 S1902-0A068						2														

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
(1)	(A) SOURCE CD	(B)(C) MAINT. CD	(C) REC. CODE	(2)						(3)			(4)	(5)	(6)	(7)						(8)	(9)	(10)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
				FEDERAL STOCK NUMBER						MODEL						DESCRIPTION									30 DAY MAINT. ALW.								ILLUSTRATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
				1	2	3	4	5	6	1	2	3	4	5	6				(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)			(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
X2	F	F														C	X00940 MOUNTING, SWITCH 77633 M1902-OA033																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	</

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE										(10)												
(1) (A) SOURCE CD	(B) MAINT. CD	(C) REC. CODE	(2)		(3)						(4) UNIT OF ISSUE	(5) QTY INC IN UN PK	(6) QTY INC IN UNIT	(7) 30 DAY MAINT. ALW.					(8) PER 100 EQUIP. 1 YR. ALW.	(9) DEPOT MAINT. ALW. PER 100 EQUIP. CNTGCTY PL.	(10) ILLUSTRATION	
			FEDERAL STOCK NUMBER	MODEL	IND. CD	DESCRIPTION	DS			GS												
							(A) 1-20	(B) 21-50	(C) 51-100	(A) 1-20				(B) 21-50	(C) 51-100	(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER					
C	F	5310-261-8278				* X01120 WASHER SAME AS X00430						REF						6-5	15			
C	F	5325-276-6089				C X01130 GROMMET 96906 MS35489-16							4					6-5				
X2	F					C X01140 ADAPTER, PIPE TO CONNECTOR 77633 M1902-0A028							2									
C	F					D X01150 WASHER, NONMETALLIC 77633 S1902-0A060							6					6-5	16			
X2	F					D X01160 COUPLING, HOSE 82436 1-2-3-4-1-1-16							4					6-5	17			
X1	F					D X01170 ADAPTER, TUBE 11699 404-1-2-1-2							10					6-5	18			
C	F					D X01180 TUBE, COPPER 77633 S1902-0A059-25							4					6-5	19			
X1	F					D X01190 ELBOW, TUBE 11699 407S1-2-1-2							36					6-5	20			
X2	F					D X01200 UNION, PIPE 11699 C402M1-2-1-2							4					6-5	21			
X2	F					C X01210 VALVE ASSEMBLY 77633 M1902-0A027							2					6-5				

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																									
(1)		(2)		(3)						(4)	(5)	(6)	(7)					(8)	(9)	(10)					
SOURCE CD	(A)	(B)	(C)	FEDERAL STOCK NUMBER	MODEL						DESCRIPTION	UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UNIT	30 DAY MAINT. ALW.					1 YR. ALW. PER 100 EQUIP.	DEPT MAINT. ALW. PER 100 EQUIP.	ILLUSTRATION			
					1	2	3	4	5	6					IND	CD	DS	GS	(A)				(B)	(C)	(D)
P	F										D	X01220 SWITCH, INTERLOCK 90800 2600-1811 1-2			2	*	2	2	*	*	2	13	6	6-5	22
X2	F										D	X01221 ADAPTER, TUBE 11699 404-1-2-1-2		1										6-5	23
C	F										D	X01230 TUBE, COPPER 77633 S1902-0A059-18		6										6-5	24
X1	F										D	X01240 ELBOW, TUBE SAME AS X01190		REF										6-5	25
H	H										D	X01250 PLATE, INSTRUCTION 77633 S1902-0A084-3		2										6-5	26
X2	F										D	X01260 VALVE, GATE 11699 479A1-2		8										6-5	27
C	F										D	X01270 TUBE, COPPER 77633 S1902-0A059-24		10										6-5	28
X2	F										D	X01280 UNION, PIPE 11699 C402-1-2	4730-988-7307	16										6-5	29
C	F										D	X01290 TUBE, COPPER 77633 S1902-0A059-10		4										6-5	30
X1	F										D	X01300 ELBOW, TUBE 11699 409-1-2CUI-2		2										6-5	31
P	F										D	X01310 SWITCH, INTERLOCK 90800 2600-0911 1-2		2	*	2	2	*	*	*	2	13	6	6-5	32

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE													(10)											
(1)	(A)	(B)	(C)	REC. CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION						(4) UNIT OF ISSUE	(5) QTY INC IN UNIT	(6) QTY INC IN UNIT	(7) 30 DAY MAINT. ALW.						(8) 1 YR. ALW. PER 100 EQUIP. CATG. PL.	(9) DEPOT MAINT. ALW. PER 100 EQUIP.	(10)	
SOURCE CD		MAINT. CD				MODEL			IND. CD						DS		GS		ILLUSTRATION					
						1	2	3	4	5	6				(A)	(B)	(C)	(A)	(B)	(C)			FIGURE NUMBER	ITEM OR SYMBOL NUMBER
X1	F									D	X01320 ADAPTER, TUBE SAME AS X01170		REF				5-5	33						
C	F									D	X01330 TUBE, COPPER 77633 S1902-OA059-16		2				6-5	34						
X1	F									D	X01340 ELBOW, TUBE SAME AS X01190		REF				6-5	35						
M	H									D	X01350 PLATE, INSTRUCTION 77633 S1902-OA084-4		2				6-5	36						
X2	F									D	X01360 VALVE, GATE SAME AS X01260		REF				6-5	37						
C	F									D	X01370 TUBE, COPPER SAME AS X01270		REF				6-5	38						
X2	F									D	X01380 TEE, TUBE 11699 W411-1-2-1-2-1-2		44				6-5	39						
C	F									D	X01390 TUBE, COPPER 77633 S1902-OA059-17		2				6-5	40						
X2	F									D	X01391 ELBOW, TUBE 11699 W407-1-2-1-2		REF				6-5	41						
X2	F									D	X01392 TUBE, COPPER 11699 S1902-OA059-13		1				6-5	42						
X2	F									D	X01400 UNION, PIPE SAME AS X01280		REF				6-5	43						
											4730-988-7307													

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																				
(1) SOURCE CD	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION						(4) UNIT OF ISSUE	(5) QTY INC IN UN PK	(6) QTY INC IN UNIT	(7) 30 DAY MAINT. ALW.						(8) PER 100 EQUIP.	(9) DEPOT MAINT. ALW. PER 100 EQUIP.	(10) ILLUSTRATION	
		MODEL									DS								GS	
(A)	(B)	(C)	1	2	3	4	5	6	IND	CD							(A)	(B)		
X2	F									C	X01410 CLAMP, LOOP 84971 4C56SS10AF							6-5	44	
X2	F									C	X01420 SUPPORT 77633 M1902-0A032							6-5	45	
C	F								*	X01430 SCREW, MACHINE 77633 CPP1903D0018C-7										
C	F								*	X01440 WASHER, FLAT SAME AS X00400										
C	F								*	X01450 WASHER SAME AS X00420										
C	F								*	X01460 NUT, PLAIN HEX. 77633 CPP2025B001-85C										
X2	F									C	X01470 BRACKET, MOUNTING 77633 M1902-0A034							6-5	46	
X2	F									C	X01480 BRACKET, MOUNTING 77633 M1902-0B015							6-5	47	
X2	F									C	X01490 CLAMP, LOOP 84971 4C56SS17AF							6-5	48	
C	F								*	X01500 SCREW, MACHINE SAME AS X00390										
C	F								*	X01510 WASHER, FLAT SAME AS X00410										

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE													(10) ILLUSTRATION									
(1) SOURCE CD	(A) MAINT. CD	(B)(C) REC. CODE	(2) FEDERAL STOCK NUMBER		(3) DESCRIPTION						(4) UNIT OF ISSUE	(5) QTY INC IN UN PK		(6) QTY INC IN UNIT	(7) 30 DAY MAINT. ALW.						(8) PER 100 EQUIP. CNTRY PL.	(9) DEPOT MAINT. ALW. PER 100 EQUIP.
			MODEL						DS						GS							
				1	2	3	4	5	6					(A)	(B)	(C)	(A)	(B)	(C)			
C	F		5310-261-8278							* X01520 WASHER SAME AS X00430		REF										
X2	F									C X01530 BRACKET, MOUNTING 77633 M1902-OB010		2									6-5	49
X2	F									C X01540 PLATE, MOUNTING 77633 S1902-0A063		2									6-5	50
X2	F									C X01550 CLAMP, LOOP SAME AS X01410		42									6-5	51
X2	F									C X01560 BRACKET, ANGLE 77633 S1902-0A065		2									6-5	52
C	F									* X01570 SCREW, MACHINE SAME AS X01430		REF										
C	F									* X01580 WASHER, FLAT SAME AS X00400		REF										
C	F		5310-576-0546							* X01590 WASHER SAME AS X00420		REF										
C	F									* X01600 NUT, PLAIN HEX. SAME AS X01460		REF										
X2	F									C X01610 BRACKET, ANGLE 77633 S1902-0A034		6									6-5	53
X2	F									C X01620 BRACKET, ANGLE SAME AS X01610		REF									6-5	54

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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SOURCE CD	MAINT CD	FEDERAL STOCK NUMBER	MODEL						DESCRIPTION	UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UN	30 DAY MAINT. ALW.						PER 100 EQUIP.	DEPOT MAINT. ALW. PER 100 EQUIP.	ILLUSTRATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
			1	2	3	4	5	6					DS (A)	DS (B)	DS (C)	GS (A)	GS (B)	GS (C)			(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																									
(1) SOURCE CD	(A) (B) (C) MAINT. CD	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION						(4) UNIT OF ISSUE	(5) QTY INC IN UN PK	(6) QTY INC IN UN	(7) 30 DAY MAINT. ALW.									(8) 1 YR. ALW. PER 100 EQUIP.	(9) DEPOT MAINT. ALW. PER 100 EQUIP.	(10) ILLUSTRATION		(11) ITEM OR SYMBOL NUMBER
			MODEL									DS			GS			(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER						
			1	2	3	4	5	6				(A)	(B)	(C)	(A)	(B)	(C)								
X2	F	4730-988-7307						C	X01740 PIPING, COOLANT 77633 M1902-OA030		2										6-5		61		
X2	F							D	X01750 UNION, PIPE SAME AS X01280		REF										6-5		62		
C	F							D	X01760 TUBE, COPPER 77633 S1902-OA059-20		2										6-5		63		
X1	F							D	X01770 ELBOW, TUBE SAME AS X01190		REF											6-5		64	
X2	F							D	X01780 ADAPTER, TUBE 11699 403R1-2-3-4		2											6-5		65	
X2	F						D	X01790 PIPE, BRASS 77633 S1902-OA056-1		2											5-5		66		
C	F						D	X01800 UNION, PIPE 97076 3-4NPT 3-4NPT		2											6-5		67		
X2	F							C	X01810 CLAMP, LOOP 84971 4C56SS38AF		4										6-5				
C	F								X01820 SCREW, MACHINE SAME AS X01430		REF										6-5				
C	F								X01830 WASHER, FLAT SAME AS X00400		REF										6-5				
C	F	5310-576-0546							X01840 WASHER SAME AS X00420		REF										6-5				

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																										
(1)		(2)		(3)										(4)	(5)	(6)	(7)						(8)	(9)	(10)	
SOURCE CD	(A) (B) (C)	FEDERAL STOCK NUMBER	MODEL						DESCRIPTION	UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UNIT	30 DAY MAINT. ALW.						1 YR. ALW. PER 100 EQUIP. CNTGTY PL.	DEPOT MAINT. ALW. PER 100 EQUIP.	ILLUSTRATION					
			1	2	3	4	5	6					DS	(A)	(B)	(C)	(A)	(B)			(C)	(A)	(B)			
C	F	5310						*	X01850 NUT, PLAIN HEX. 77633 S1902-0A080		8												6-5	67		
P	F							C	X01860 HEATER, COOLANT 77633 M1902-0A019		2	*	*	*	*	*	*	*		5	2		6-5			
P	F							D	X01870 HEATER, COOLANT 77633 M1902-0A017		2	*	*	*	*	*	*	*		5	2		6-5	68		
X2	F							D	X01880 HEATER, COLLANT 77633 M1902-0B018		2											6-5	69			
X2	F	5340						C	X01890 BRACKET, SUPPORT 77633 S1902-0A081		2											6-5	70			
C	F	5305						*	X01900 SCREW, MACHINE SAME AS X01430		REF											6-5	70			
C	F	5310						*	X01910 WASHER, FLAT SAME AS X00400		REF											6-5				
C	F	5310-576-0546						*	X01920 WASHER SAME AS X00420		REF											6-5				
C	F	5305						*	X01930 SCREW, MACHINE SAME AS X00390		REF											6-5				
C	F	5310						*	X01940 WASHER, FLAT SAME AS X00410		REF											6-5				
C	F	5310-261-8278						*	X01950 WASHER SAME AS X00430		REF											6-5				

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE													(7) 30 DAY MAINT. ALW.										(9)	(10) ILLUSTRATION					
(11)		(A) (B) (C)		REC. CODE		(2) FEDERAL STOCK NUMBER		(3) DESCRIPTION						(4) UNIT OF ISSUE		(5) QTY INC IN UN PK		(6) QTY INC IN UN		(8) PER 100 EQUIP. PL. 1 YR. ALW.						(9) DEPOT MAINT. ALW. PER 100 EQUIP. PL.		(10) ILLUSTRATION	

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																									
(1)		(2)		(3)						(4)	(5)	(6)	(7)						(8)	(9)	(10)				
(A) SOURCE CD	(B)(C) MAINT. CD	(C) REC. CODE	FEDERAL STOCK NUMBER	MODEL						IND. CD	DESCRIPTION	QTY INC IN UN PK	QTY INC IN UNIT	30 DAY MAINT. ALW.						1 YR. ALW. PER 100 EQUIP.	DEPOT MAINT. ALW. PER 100 EQUIP.	ILLUSTRATION (A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER		
				1	2	3	4	5	6					(A) 1-20	(B) 21-50	(C) 51-100	(A) 1-20	(B) 21-50	(C) 51-100						
X2 F	F								C	X02070 PLATE, MOUNTING 77633 S1902-0A066		2									6-5	76			
X2 F	F		5340						C	X02080 BRACKET, ANGLE 77633 S1902-0A067		2									6-5	77			
X2 F	F		5340						C	X02090 CLAMP, LOOP SAME AS X01410	REF										6-5	78			
P F	F		5985-044-5942						C	X02100 LINE, RF TRANSMISSION SAME AS X00840	REF										6-5	79			
P F	F		5985-045-4188						C	X02110 LINE, RF TRANSMISSION 94661 PA10-62-1		2	*	*	*	*	*	*	5	2	6-5	80			
X2 F	F		4730						C	X02120 CLAMP, HOSE SAME AS X00720	REF										6-5	81			
X2 F	F								C	X02130 RETAINER, DUMMY LOAD 77633 M1902-0A011		4									6-5	82			
C F	F		5305						*	X02140 SCREW, MACHINE SAME AS X00390	REF										6-5				
C F	F		5310						*	X02150 WASHER, FLAT SAME AS X00410	REF										6-5				
C F	F		5310-261-8278						*	X02160 WASHER SAME AS X00430	REF										6-5				

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																						
(1) (A) SOURCE CD	(B) MAINT. CD	(C) REC. CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION						(4) UNIT OF ISSUE	(5) QTY INC IN UN PK	(6) QTY INC IN UNIT	(7) 30 DAY MAINT. ALW.						(8) PER 100 EQUIP. CNTGCTY PL.	(9) DEPOT MAINT. ALW. PER 100 EQUIP.	(10) ILLUSTRATION	
				MODEL									DS		GS		(C)					
																		(A)				
1	2	3	4	5	6	IND. CD													(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER		
X2 F			6625				C	X02170 DUMMY LOAD, ELECTRICAL 06980 WL120				2							6-5	83		
X2 F							C	X02180 PIPING, FLUID 77633 WL1902-0A021				2							6-5			
C F			4710				D	X02190 TUBE, COPPER 77633 SL1902-0A059-1				2							6-5	84		
X1 F			4730				D	X02200 ELBOW, TUBE SAME AS X01190			REF								6-5	85		
C F			4730				D	X02210 PLUG, TUBE FITTING 63686 3430-1-2SPS				2							6-5	86		
X2 F			4730				D	X02220 TEE 11699 412-1-2-1-2-1-2			5								6-5	87		
C F			4710				D	X02230 TUBE, COPPER SAME AS X01230			REF								6-5	88		
C F			4710				D	X02240 TUBE, COPPER 77633 SL1902-0A057			8								6-5	89		
X2 F							D	X02250 BUSHING, REDUCER 11699 417-3-8-18			2								6-5	90		
X2 F			4730				D	X02260 TEE, TUBE 11699 W411R1-2-3-8-3-8			6								6-5	91		

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE										ILLUSTRATION									
(1)										(10)									
(A) SOURCE CD										(A) FIGURE NUMBER									
(B) MAINT. CD										(B) ITEM OR SYMBOL NUMBER									
(C) REC. CODE										(C) NUMBER									
(2)										(7)									
FEDERAL STOCK NUMBER										30 DAY MAINT. ALW.									
MODEL										DS									
IND. CD										GS									
1 2 3 4 5 6										(A) (B) (C)									
(3)										(8)									
DESCRIPTION										PER 100 EQUIP.									
UNIT OF ISSUE										(9)									
(4)										(5)									
QTY INC IN UN PK										QTY INC IN UNIT									
(5)										(6)									
D X02270 TUBE, COPPER 77633 SI902-DA058-2										4									
D X02280 ELBOW, TUBE 11699 W407-3-8-3-8										4									
D X02290 TUBE, COPPER 77633 SI902-DA058-1										4									
D X02300 ELBOW, TUBE 11699 C409U3-8-3-8										2									
C X02310 VALVE, CHECK 77633 M1902-OA022										2									
D X02320 VALVE, CHECK 63686 406-3-8 SPS										4									
D X02330 ADAPTER, TUBE 11699 404-3-8-3-8										4									
D X02340 TUBE, COPPER 77633 SI902-DA058-3										2									
D X02350 TUBE, COPPER SAME AS X02240										REF									
D X02360 BUSHING, REDUCER 11699 417-3-8-1-8										6									
D X02370 TEE, TUBE SAME AS X02260										REF									
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[illegible]

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE														(1)		(11)											
SOURCE CD	(A) MAINT. CD	(B) REC. CODE	(C)	(2) FEDERAL STOCK NUMBER		(3) DESCRIPTION						(4) UNIT OF ISSUE	(5) QTY INC IN UN PK	(6) QTY INC IN UNIT	(7) 30 DAY MAINT. ALW.						(8) 1 YR. ALW. PER 100 EQUIP. CNTGCTY PL.	(9) DEPOT MAINT. ALW. PER 100 EQUIP.	(10) ILLUSTRATION				
				1	2	3	4	5	6	1	2				3	4	5	6	(A) DS	(B) DS			(C) DS	(A) GS	(B) GS	(C) GS	(A) FIGURE NUMBER
C	F			4710							D X02490 TUBE, COPPER 77633 S1902-0A059-9				2											6-5	112
X2	F										C X02500 PIPING, COOLANT 77633 M1902-0A029				2											6-5	
C	F			4710							D X02510 TUBE, COPPER 77633 S1902-0A059-2				4											6-5	113
X2	F			4730							D X02520 TUBE, TUBE, SAME AS X01380			REF												6-5	114
C	F										D X02530 TUBE, COPPER 77633 S1902-0A059-3				4											6-5	115
C	F			4710							D X02540 TUBE, COPPER SAME AS X01290			REF												6-5	116
X1	F			4730							D X02550 ELBOW, TUBE SAME AS X01190			REF												6-5	117
M	H			9905							D X02560 PLATE, INSTRUCTION 77633 S1902-0A084-2				2											6-5	118
X2	F										D X02570 VALVE, GATE SAME AS X01260			REF												6-5	119
C	F			4710							D X02580 TUBE, COPPER 77633 S1902-0A059-15				2											6-5	120
C	F			4710							D X02590 TUBE, COPPER 77633 S1902-0A059-7				2											6-5	121

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																								
(1)		(2)		(3)						(4)	(5)	(6)	(7)					(8)	(9)	(10)				
(A) SOURCE CD	(B) MAINT. CD	(C) REC. CODE	FEDERAL STOCK NUMBER	MODEL						IND. CD	DESCRIPTION	UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UN UNIT	30 DAY MAINT. ALW.					1 YR. ALW. PER 100 EQUIP.	DEPOT MAINT. ALW. PER 100 EQUIP.	ILLUSTRATION		
				1	2	3	4	5	6						(A)	(B)	(C)	(A)	(B)			(C)	(A)	(B)
C	F		4730							D	X02600 PLUG, TUBE FITTING, SOLDER TYPE 63686 3430-1-2				4								6-5	122
X2	F		4730							D	X02610 TEE SAME AS X02220			REF									6-5	123
C	F		4710							D	X02620 TUBE, COPPER SAME AS X02510			REF									6-5	124
X2	F									C	X02630 ADAPTER, PIPE TO CONNECTOR 77633 M1902-0A035			2									6-5	
C	F		5310							D	X02640 WASHER, NONMETALLIC SAME AS X01150			REF									6-5	125
X2	F		4730							D	X02650 COUPLING, HOSE 82436 1-2-3-4-1-16			2									6-5	126
X2	F									C	X02660 PIPING, COOLANT 77633 M1902-0A026			2									6-5	
X2	F		4730							D	X02670 UNION, PIPE SAME AS X01200			REF									6-5	127
C	F		4710							D	X02680 TUBE, COPPER SAME AS X01270			REF									6-5	128
X2	F		4730-988-7307							D	X02690 UNION, PIPE SAME AS X01280			REF									6-5	129

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																				
(1)		(2)		(3)						(4)	(5)	(6)	(7)				(8)	(9)	(10)	
SOURCE CD	(A) (B) (C)	FEDERAL STOCK NUMBER	MODEL						DESCRIPTION	UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UNIT	30 DAY MAINT. ALW.				1 YR. ALW. PER 100 EQUIP.	DEPOT MAINT. ALW. PER 100 EQUIP.	ILLUSTRATION	
			1	2	3	4	5	6					DS (A)	DS (B)	CS (C)	GS (A)			GS (B)	GS (C)
X1 F		4730						D	X02700 ELBOW, TUBE SAME AS X01190			REF						6-5	130	
C F		4710						D	X02710 TUBE, COPPER 77633 S1902-0A059-6			2						6-5	131	
X2 F		4730						D	X02720 TEE, TUBE SAME AS X01380			2						6-5	132	
C F		4710						D	X02730 TUBE, COPPER 77633 S1902-0A059-22			2						6-5	133	
X2 F		4730						D	X02740 TEE, TUBE SAME AS X01380			REF						6-5	134	
C F		4710						D	X02750 TUBE, COPPER 77633 S1902-0A059-8			2						6-5	135	
C F		4710						D	X02760 TUBE, COPPER 77633 S1902-0A059-14			2						6-5	136	
X2 F								C	X02770 VALVE, CHECK 77633 M1902-0A023			2						6-5		
C F		4710						D	X02780 TUBE, COPPER 77633 S1902-0A059-12			2						6-5	137	
X2 F		4730						D	X02790 TEE, TUBE SAME AS X01380			REF						6-5	138	
C F		4710						D	X02800 TUBE, COPPER SAME AS X01230			REF						6-5	139	

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																								
(1)	(4A)	(4B)(C)	(2)		(3)						(4)	(5)	(6)	(7)						(8)	(9)	(10)		
SOURCE CD	MAINT. CD	REC. CODE	FEDERAL STOCK NUMBER	MODEL						IND. CD	DESCRIPTION	UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UN	30 DAY MAINT. ALW.						PER 100 EQUIP.	DEPOT MAINT. 100 EQUIP.	ILLUSTRATION	
				1	2	3	4	5	6						DS	GS	(A)	(B)	(C)	(A)			(B)	(C)
C	F		4710							D	X02810 TUBE, COPPER SAME AS X02240					REF							6-5	140
X2	F									D	X02820 BUSHING, REDUCER SAME AS X02360					REF							6-5	141
X2	F		4730							D	X02830 TEE, TUBE 11699 W411R1-2-3-8-38				2								6-5	142
C	F		4710							D	X02840 TUBE, COPPER SAME AS X02530					REF							6-5	143
X1	F									D	X02850 ADAPTER, TUBE SAME AS X02330					REF							6-5	144
X1	F									D	X02860 VALVE, CHECK SAME AS X02320					REF							6-5	145
X2	F		5340							C	X02870 CLAMP, LOOP 84971 4C56SS8AF				2								6-5	146
X2	F		5340							C	X02880 BRACKET, ANGLE 77633 S1902-DA064				2								6-5	147
C	F		5305							*	X02890 SCREW, MACHINE SAME AS X01430					REF								
C	F		5310							*	X02900 WASHER, FLAT SAME AS X00400					REF								
C	F		5310-576-0546							*	X02910 WASHER SAME AS X00420					REF								

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REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																											
(1)	(A)	(B)	(C)	(2)										(3)	(4)	(5)	(6)	(7)						(8)	(9)	(10)	
SOURCE CD	MAINT. CD	FEDERAL STOCK NUMBER	IND. CD	MODEL						DESCRIPTION	UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UN	30 DAY MAINT. ALW.	DS			GS			1 YR. ALW. PER 100 EQUIP. CNTGCT PL.	DEPOT MAINT. ALW. PER 100 EQUIP.	FIGURE NUMBER	ITEM OR SYMBOL NUMBER			
				1	2	3	4	5	6						(A)	(B)	(C)	(A)	(B)	(C)							
X2 F										D X03030 BUSHING, REDUCER SAME AS X02360														6-5	154		
X2 F		4730								D X03040 TEE, TUBE SAME AS X02260														6-5	155		
C F		4710								D X03050 TUBE, COPPER SAME AS X01270														6-5	156		
X2 F		4730								D X03060 TEE, TUBE SAME AS X01380														6-5	157		
X1 F		4730								D X03070 ELBOW, TUBE SAME AS X01190														6-5	158		
C F		4730								D X03080 PLUG, TUBE FITTING, SOLDER TYPE SAME AS X02600														6-5	159		
X2 F		4730								D X03090 TEE SAME AS X02220														6-5	160		
C F		4710								D X03100 TUBE, COPPER SAME AS X02380														6-5	161		
C F		4710								D X03110 TUBE, COPPER 77633 S1902-DA059-19														6-5	162		
X2 F										D X03120 ADAPTER, TUBE 11699 403R1-2CU3-4														6-5	163		

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																			
(1)		(2)		(3)						(4)	(5)	(6)	(7)			(8)	(9)	(10)	
SOURCE CD	MAINT. CD	FEDERAL STOCK NUMBER	MODEL						DESCRIPTION	UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UNIT	30 DAY MAINT. ALW.			PER 100 EQUIP.	DEPOT MAINT. ALW. PER 100 EQUIP.	FIGURE NUMBER	ITEM OR SYMBOL NUMBER
			1	2	3	4	5	6					DS (A)	DS (B)	DS (C)				
X2 F		4710						D	X03130 PIPE, BRASS 77633 SL902-0A056-2			1						6-5	164
C F		4730						D	X03140 UNION, PIPE 97076 3-4NPT13-4NPT1		2							6-5	165
P F		6685						C	X03150 THERMOCOUPLE, IMMERSION 77633 CPP2040A001		2	*	*	*	*	5	2	6-5	166
X2 F								C	X03160 FRAME, MOUNTING 77633 M1902-0B001		2							6-5	
X2 F								D	X03170 COVER 77633 SL902-0C009		2							6-5	167
C F		5305						*	X03180 SCREW, MACHINE 77633 CPP2125B001-8-8		8							6-5	
C F		5310-576-0546						*	X03190 WASHER SAME AS X00420		REF							6-5	
C F		5310						*	X03200 NUT, PLAIN HEX. SAME AS X01460		REF							6-5	
X2 F								D	X03210 BASE 77633 NO NUMBER		2							6-5	168
C F		5305						*	X03220 BOLT, MACHINE 77633 CPP2153A001-4		12							6-5	

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
(1)		(2)		(3)						(4)	(5)	(6)	(7)						(8)	(9)	(10)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
SOURCE CD	(A)	(B)	(C)	FEDERAL STOCK NUMBER	MODEL						DESCRIPTION	UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UNIT	30 DAY MAINT. ALW.						1 YR. ALW. PER 100 EQUIP. CNTG CY PL.	DEPOT MAINT. ALW. PER 100 EQUIP.	ILLUSTRATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
					1	2	3	4	5	6					IND. CD	DS	(A)	(B)	(C)	(A)			(B)	(C)	GS	(A)	(B)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
C	F			5310-809-4058							* X03230 WASHER 96906 MS15795-210			12																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		

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REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																										
(1)		(2)		(3)						(4)	(5)	(6)	(7)						(8)	(9)	(10)					
SOURCE CD	(A) MAINT CD	(B) REC CODE	(C) FEDERAL STOCK NUMBER	MODEL						DESCRIPTION	UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UN UNIT	30 DAY MAINT. ALW.						1 YR. ALW. PER 100 EQUIP. CNTGY PL.	DEPOT MAINT. ALW. PER 100 EQUIP.	ILLUSTRATION				
				1	2	3	4	5	6					ND CD	(A)	(B)	(C)	(A)	(B)			(C)	(A)	(B)		
P	F		6625						C	X03340 WATTMETER 77633 CPP2041A001			1	*	2	*	*	2	8	3	6-6	5				
C	F		5310-184-8977						*	X03350 WASHER SAME AS X00130		REF														
C	F		5310						*	X03360 NUT, PLAIN HEX. SAME AS X00450		REF														
P	F		5925						C	X03370 CIRCUIT BREAKER 74193 AM333MG6-15-250-60-4			1	*	2	*	*	2	8	3	6-6	6				
C	F		5305						*	X03380 SCREW, MACHINE SAME AS X00200		REF														
C	F		5310-184-8977						*	X03390 WASHER SAME AS X00130		REF														
P	F		5945-865-3766						C	X03400 RELAY, ARMATURE 99699 HAI15W0KK12A			1	*	2	*	*	2	8	3	6-6	7				
P	F		5935-065-0786						C	X03410 SOCKET, RELAY 99699 6403-11			1	*	*	*	*	*	4	1	6-6	8				
X2	F		5310-208-4396						C	X03430 BUSHING 37942 A11260-2			1													
C	F		5305						*	X03450 SCREW, MACHINE 77633 CPP1903D001BC6-12			5													

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REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE											(10)											
(1) (A)	(B)(C) MAINT. CD	(C) REC. CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION						(4) UNIT OF ISSUE	(5) QTY INC IN UN PK	(6) QTY INC IN UNIT	(7) 30 DAY MAINT. ALW.						(8) PER 100 EQUIP. CNTGCTY PL.	(9) DEPOT MAINT. ALW. PER 100 EQUIP.	(10) ILLUSTRATION	
				(3) DESCRIPTION									DS		GS		(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
C	F		5310-184-8996									1										
X2	F		5940									1							11			
C	F		5305									REF							6-6			
C	F		5310-184-8977									REF							6-6			
X2	F											1							12			

SECTION V. INDEX-FEDERAL STOCK NUMBER CROSS REFERENCE TO INDEX NUMBER

FEDERAL STOCK NUMBER	INDEX NO.	REF. NUMBER	INDEX NO.	REF. NUMBER	INDEX NO.
4730-988-7307	X01280	A1902-0A002	X00100	CPP2025B001-411C	X00780
5305-207-8998	X00070	A1902-0A003	X00680	CPP2040A001	X03150
5310-167-0876	X00210	A1902-0A004	X00140	CPP2041A001	X03340
5310-184-8970	X00770	A1902-0A005	X00670	CPP2101A001	X00560
5310-184-8977	X00130	AM333MG6-15-250-60-4	X03370	CPP2107D001CB416	X00760
5310-184-8996	X03460	C402M1-2-1-2	X01200	CPP2107D001CB6	X00120
5310-208-4396	X03430	C409U3-8-3-8	X02300	CPP2107D001CB8	X00400
5310-261-8278	X00430	CPA1975-2A26	X00570	CPP2107D001CB10	X00410
5310-275-5512	X03250	CPA2160A001-71	X00080	CPP2125B001-1-4-8	X00950
5310-335-0057	X00530	CPP1902B001BC35	X00150	CPP2125B001-8-8	X03180
5310-576-0546	X00420	CPP1903D001BC4-6	X00860	CPP2153A001-4	X03220
5310-582-5965	X03240	CPP1903D001BC6-6	X00200	CPP2155A001-8	X00750
5310-809-4058	X03230	CPP1903D001BC6-8	X00110	CPP2155A001-20	X00900
5325-276-6089	X01130	CPP1903D001BC6-12	X03450	CPP2193A001-4	X00060
5325-281-1557	X02040	CPP1903D001BC8-7	X01430	CPP2195A001-67	X00090
5340-770-3814	X00260	CPP1903D001BC8-8	X00370	H1902-0A002	X00630
5935-065-0786	X03410	CPP1903D001BC8-20	X02010	M1902-0A002	X03270
5935-193-3550	X00850	CPP1903D001BC10-8	X00390	M1902-0A004	X00280
5935-195-8967	X00640	CPP1903D001BC10-14	X00590	M1902-0A008	X03510
5945-865-3766	X03400	CPP2018B001	X00650	M1902-0A009	X00290
5985-044-5942	X00840	CPP2019B001	X00880	M1902-0A009-1	X00340
5985-045-4188	X02110	CPP2025B001-65C	X00450	M1902-0A011	X02130
6210-553-8191	X03300	CPP2025B001-85C	X01460	M1902-0A012	X00730
6210-643-4891	X03281	CPP2025B001-105C	X00620	M1902-0A013	X00220
6240-223-9100	X03310			M1902-0A017	X01870
6625-840-5446	X03320				

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SECTION V. INDEX-FEDERAL STOCK NUMBER CROSS REFERENCE
TO INDEX NUMBER (CONTINUED)

REF. NUMBER	INDEX NO.	REF. NUMBER	INDEX NO.	REF. NUMBER	INDEX NO.
M1902-0A019	X01860	MS35649	X00250	S1902-0A059-13	X01392
M1902-0A021	X02180	QS200M485	X00720	S1902-0A059-14	X02760
M1902-0A022	X02310	S1902-0A018	X00170	S1902-0A059-15	X02580
M1902-0A023	X02770	S1902-0A019	X00180	S1902-0A059-16	X01330
M1902-0A024	X02410	S1902-0A020	X00190	S1902-0A059-17	X01390
M1902-0A025	X01700	S1902-0A027	X00160	S1920-0A059-18	X01230
M1902-0A026	X02660	S1902-0A034	X01610	S1902-0A059-19	X03110
M1902-0A027	X01210	S1902-0A056-1	X01790	S1902-0A059-20	X01760
M1902-0A028	X01140	S1902-0A056-2	X03130	S1902-0A059-21	X02380
M1902-0A029	X02500	S1902-0A057	X02240	S1902-0A059-22	X02730
M1902-0A030	X01740	S1902-0A058-1	X02290	S1902-0A059-23	X02450
M1902-0A031	X01660	S1902-0A058-2	X02270	S1902-0A059-24	X01270
M1902-0A032	X01420	S1902-0A058-3	X02340	S1902-0A059-25	X01180
M1902-0A033	X00940	S1902-0A059-1	X02190	S1902-0A060	X01150
M1902-0A034	X01470	S1902-0A059-2	X02510	S1902-0A063	X01540
M1902-0A035	X02630	S1902-0A059-3	X02530	S1902-0A064	X02880
M1902-0A038	X01090	S1902-0A059-9	X02490	S1902-0A065	X01560
M1902-0B001	X03160	S1902-0A059-4	X01680	S1902-0A066	X02070
M1902-0B010	X01530	S1902-0A059-5	X01720	S1902-0A067	X02080
M1902-0B014-1	X00990	S1902-0A059-6	X02710	S1902-0A068	X00930
M1902-0B014-2	X00790	S1902-0A059-7	X02590	S1902-0A078	X02060
M1902-0B015	X01480	S1902-0A059-8	X02750	S1902-0A079	X01970
M1902-0B016	X00740	S1902-0A059-10	X01290	S1902-0A080	X01850
M1902-0B018	X01880	S1902-0A059-11	X02430	S1902-0A081	X01890
M1972-0A007-3	X00660	S1902-0A059-12	X02780	S1902-0A083	X02000

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SECTION V. INDEX-FEDERAL STOCK NUMBER CROSS REFERENCE TO INDEX NUMBER (CONTINUED)

NUMBER	INDEX NO.	NUMBER	INDEX NO.	NUMBER	INDEX NO.
S1902-0A084-1	X02460	4C56SS38AF	X01810		
S1902-0A084-2	X02560	4C56SS8AF	X02870		
S1902-0A084-3	X01250	403R1-2CUB-4	X03120		
S1902-0A084-4	X01350	403R1-2-3-4	X01780		
S1902-0B023	X00350	404-1-2-1-2	X01170		
S1902-0B026	X00360	404-3-8-3-8	X02330		
S1902-0B042-1	X01040	406-3-8SPS	X02320		
S1902-0B042-2	X00820	407S1-2-1-2	X01190		
S1902-0C009	X03170	407-1-2-1-2	X02390		
W407-1-2-1-2	X01391	409-1-2CUI-2	X01300		
W407-3-8-3-8	X02280	412-1-2-1-2-1-2	X02220		
W411R1-2-3-8-3-8	X02260	417-3-8-1-8	X02360		
W411R1-2-3-8-38	X02830	417-3-8-18	X02250		
W411-1-2-1-2-12	X01380	442-14MME	X00580		
WL120	X02170	464-14MME	X03470		
1-2-3-4-1-16	X02650	479A1-2	X01260		
1-2-3-4-1-1-16	X01160	61-082-10	X00270		
2600-09111-2	X01310	61-2	X00500		
2600-18111-2	X01220	61-4	X00490		
3-4NPT13-4NPTE	X01800	63-8	X00510		
3-4NPT13-4NPT1	X03140	957	X00010		
3430-1-2	X02600				
3430-1-2SPS	X02210				
4C56SS10AF	X01410				
4C56SS17AF	X01490				

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SECTION VI. INDEX-FIGURE AND ITEM NUMBER CROSS REFERENCE TO INDEX NUMBER

FIG. NO.	ITEM NO. OR REFERENCE DESIGNATION	INDEX NO.	FIG. NO.	ITEM NO. OR REFERENCE DESIGNATION	INDEX NO.
6-4	1	X00060	44	X01410	X01410
	2	X00080	45	X01420	X01420
	3	X00090	46	X01470	X01470
	4	X00100	47	X01480	X01480
	6	X00180	48	X01490	X01490
	7	X00190	49	X01530	X01530
	8	X00220	50	X01540	X01540
	9	X00260	51	X01550	X01550
	10	X00270	52	X01560	X01560
	11	X00140	53	X01610	X01610
	12	X00340	54	X01620	X01620
	13	X00350	55	X01170	X01170
	14	X00360	56	X01680	X01680
	15	X00460	57	X01690	X01690
	16	X00490	58	X01710	X01710
	17	X00500	59	X01720	X01720
	18	X00510	60	X01730	X01730
	19	X00560	61	X01280	X01280
	20	X00570	62	X01760	X01760
	21	X00580	63	X01770	X01770
	22	X00640	64	X01780	X01780
	23	X00650	65	X01790	X01790
	24	X00660	66	X01800	X01800
	25	X00670	67	X01810	X01810
6-5	1	X00720	68	X01870	X01870
	2	X00730	69	X01880	X01880
	3	X00740	70	X01890	X01890
	4	X00790	71	X01970	X01970
	5	X00820	72	X02000	X02000
	6	X00840	73	X02040	X02040
	7	X00850	74	X02050	X02050
	8	X00870	75	X02060	X02060
	9	X00880	76	X02070	X02070
	13	X01040	77	X02080	X02080
	14	X01090	78	X02090	X02090
	15	X01130	79	X02100	X02100
	16	X01150	80	X02110	X02110
	17	X01160	81	X02120	X02120
	18	X91170	82	X02130	X02130
	19	X01180	83	X02170	X02170
	20	X01190	84	X02190	X02190
	21	X01200	85	X02200	X02200
	22	X01220	86	X02210	X02210
	23	X01221	87	X02220	X02220
	24	X01230	88	X02230	X02230
	25	X01240	89	X02240	X02240
	26	X01250	90	X02250	X02250
	27	X01260	91	X02260	X02260
	28	X01270	92	X02270	X02270
	29	X01280	93	X02280	X02280
	30	X01290	94	X02290	X02290
	31	X01300	95	X02300	X02300
	32	X01310	96	X02320	X02320
	33	X01320	97	X02330	X02330
	34	X01330	98	X02340	X02340
	35	X01340	99	X02240	X02240
	36	X01350	100	X02360	X02360
	37	X01360	101	X02370	X02370
	38	X01370	102	X02380	X02380
	39	X01380	103	X02390	X02390
	40	X01390	104	X02400	X02400
	41	X01391	105	X02420	X02420
	42	X01392	106	X02430	X02430
	43	X01400	107	X02440	X02440
			108	X02450	X02450

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SECTION VI. INDEX-FIGURE AND ITEM NUMBER CROSS REFERENCE TO INDEX NUMBER (CONTINUED)

FIG. NO.	ITEM NO. OR REFERENCE DESIGNATION	INDEX NO.	FIG. NO.	ITEM NO. OR REFERENCE DESIGNATION	INDEX NO.
6-5			6-6		
	109	X02460		1	X03281
	110	X02470		2	X03300
	111	X02480		3	X03320
	112	X02490		4	X03330
	113	X02510		5	X03340
	114	X02520		6	X03370
	115	X02530		7	X03400
	116	X02540		8	X03410
	117	X02550		9	X03430
	118	X02560		11	X03470
	119	X02570		12	X03510
	120	X02580			
	121	X02590			
	122	X02600			
	123	X02610			
	124	X02620			
	125	X02640			
	126	X02650			
	127	X02670			
	128	X02680			
	129	X02690			
	130	X02700			
	131	X02710			
	132	X02720			
	133	X02730			
	134	X02740			
	135	X02750			
	136	X02760			
	137	X02780			
	138	X02790			
	139	X02800			
	140	X02810			
	141	X02360			
	142	X02830			
	143	X02840			
	144	X02850			
	145	X02860			
	146	X02870			
	147	X02880			
	148	X02930			
	149	X02980			
	150	X02990			
	151	X03000			
	152	X03010			
	153	X03020			
	154	X02360			
	155	X03040			
	156	X03050			
	157	X03060			
	158	X03070			
	159	X03080			
	160	X03090			
	161	X03100			
	162	X03110			
	163	X03120			
	164	X03130			
	165	X03130			
	166	X03150			
	167	X03170			
	168	X03210			
	170	X03270			

NOTE:

ALL DIMENSIONS
ARE IN INCHES

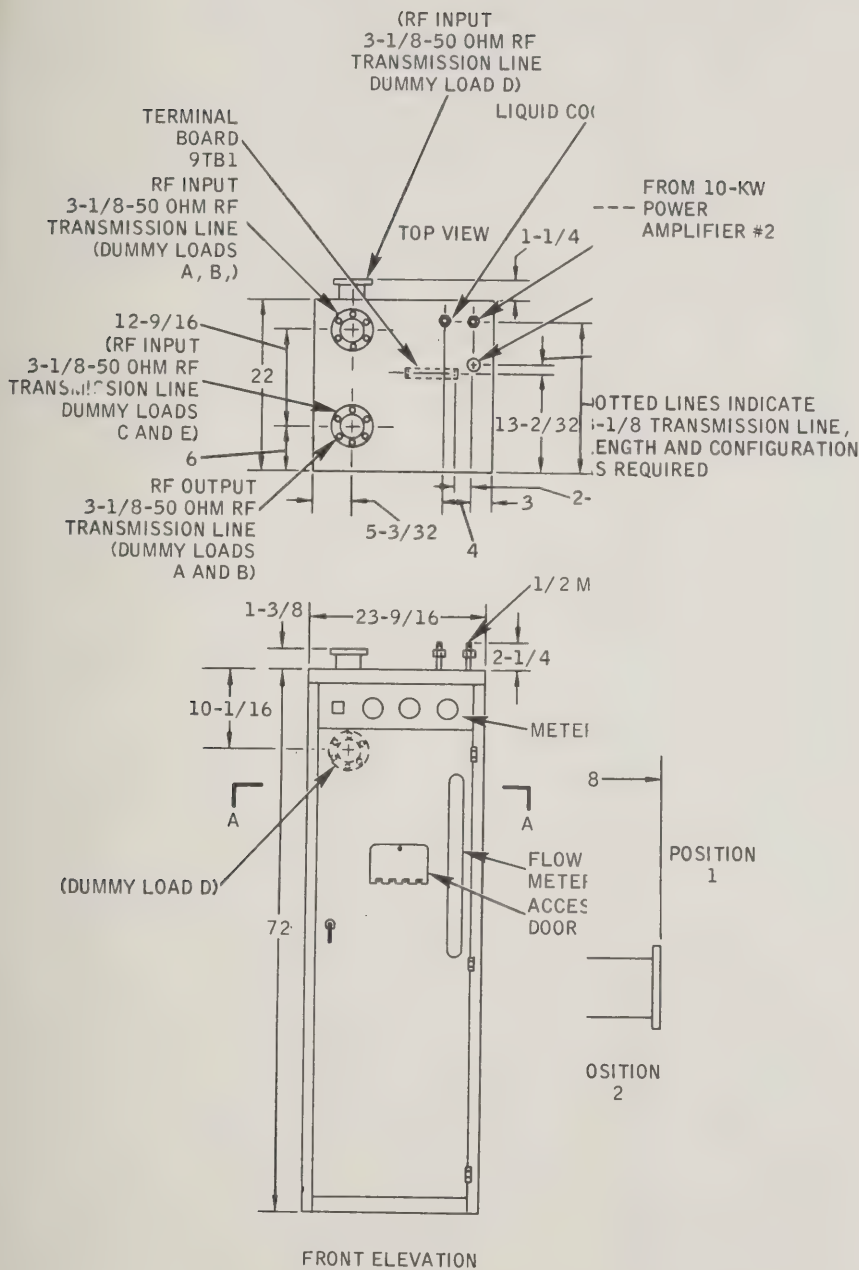


Figure 2-1. Typical Dummy

NOTE:
ALL DIMENSIONS
ARE IN INCHES

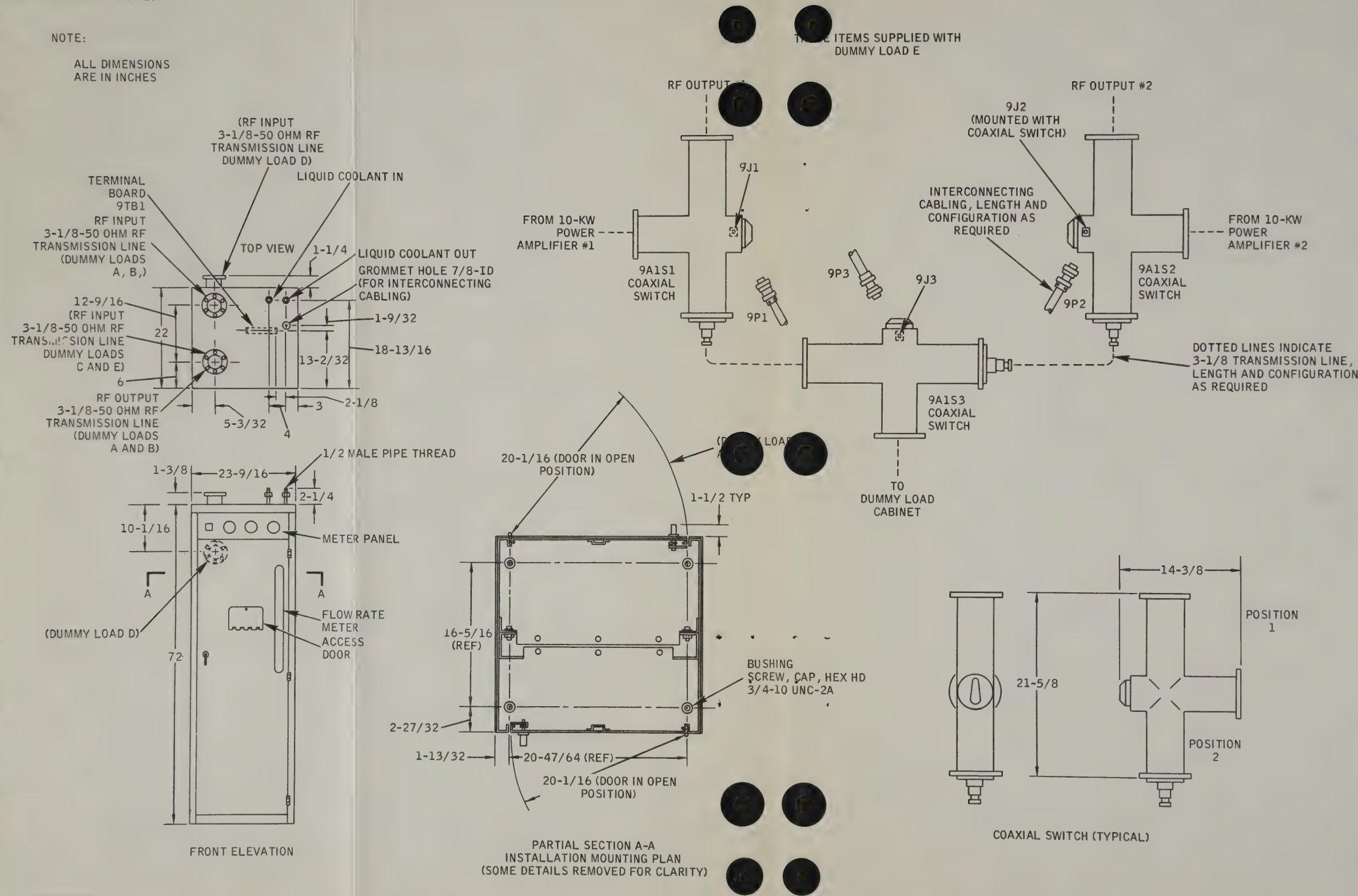


Figure 2-1. Typical Dummy Load Installation Diagram

NOTE:

ALL DIMENSIONS
ARE IN INCHES

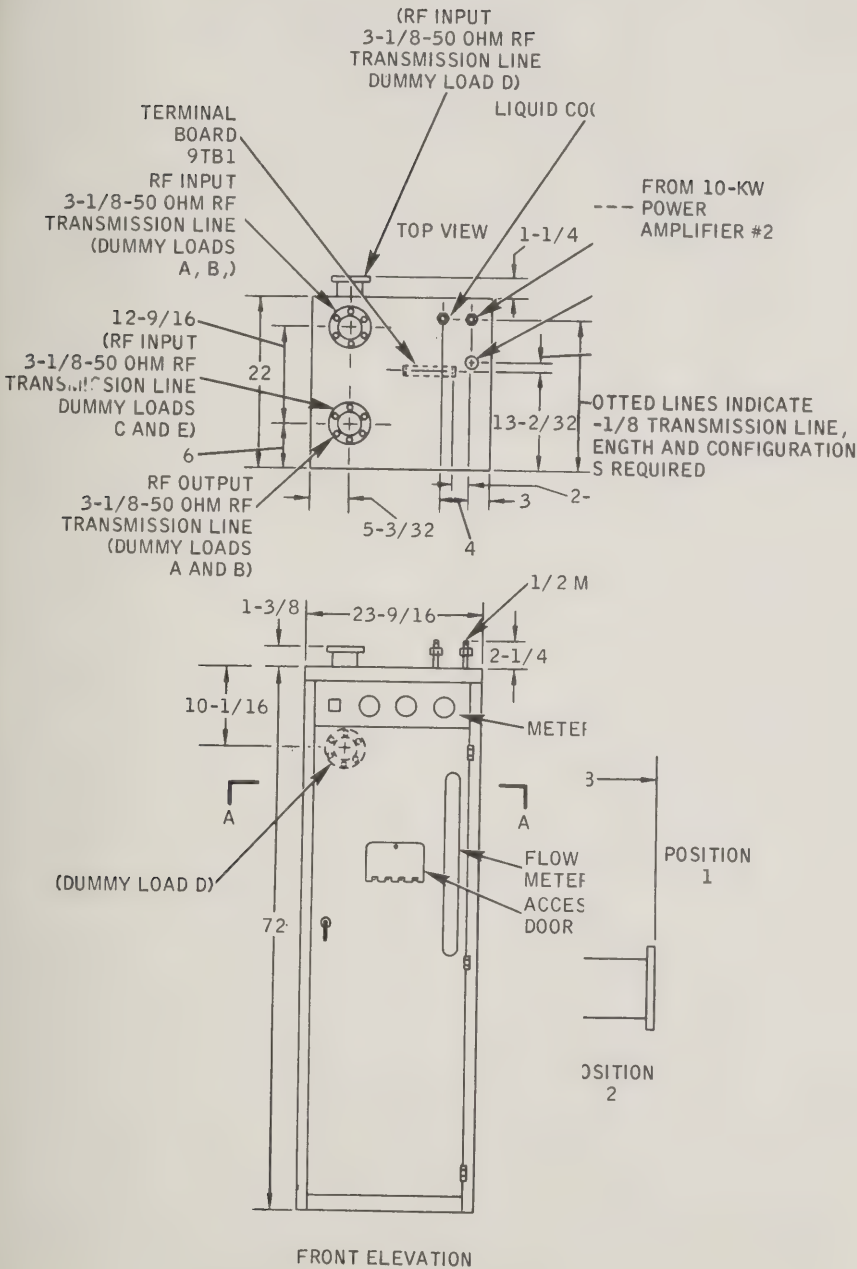
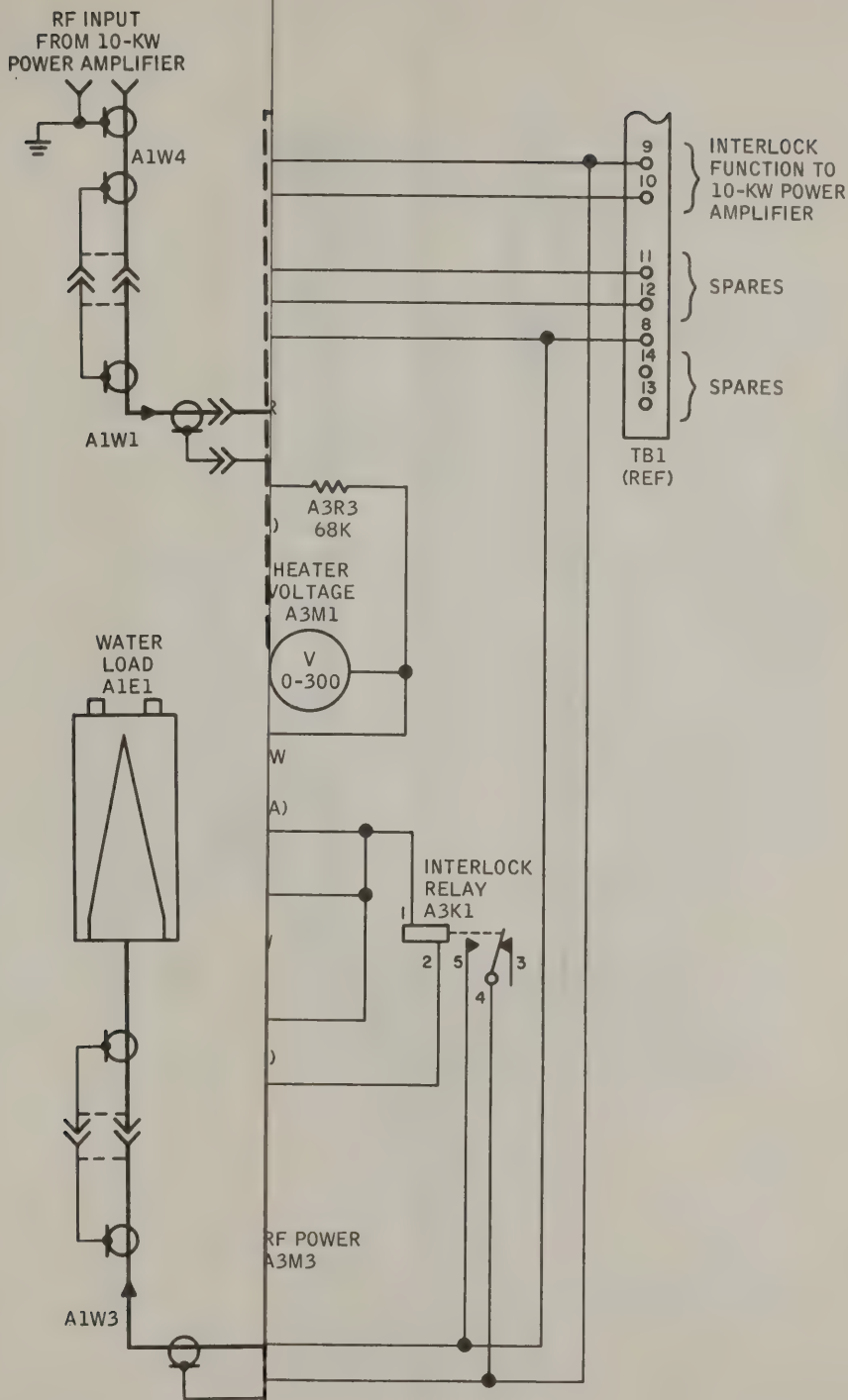


Figure 2-1. Typical Dummy



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ad A or B Schematic Diagram

NOTE:
ALL DIMENSIONS
ARE IN INCHES

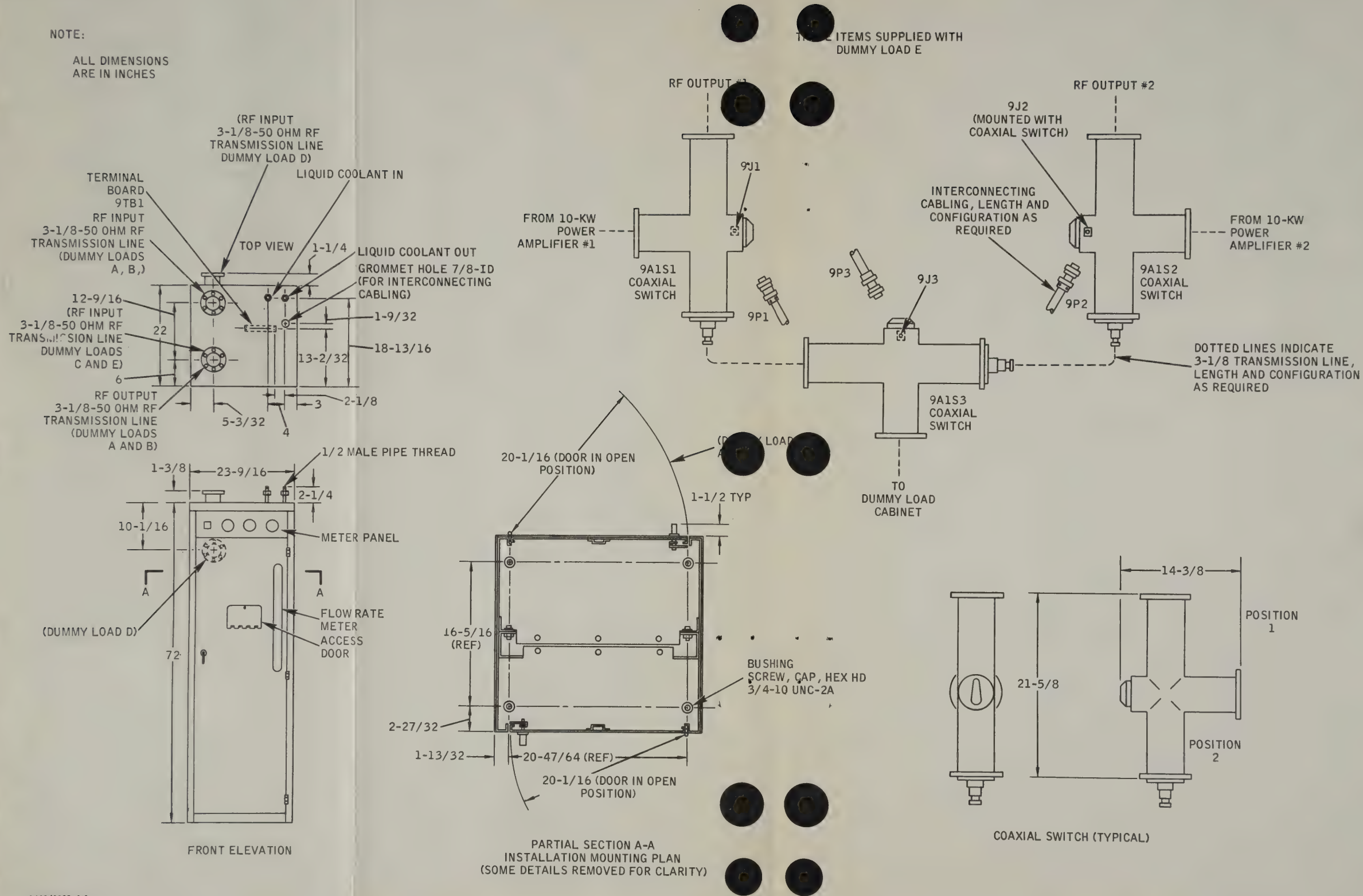


Figure 2-1. Typical Dummy Load Installation Diagram

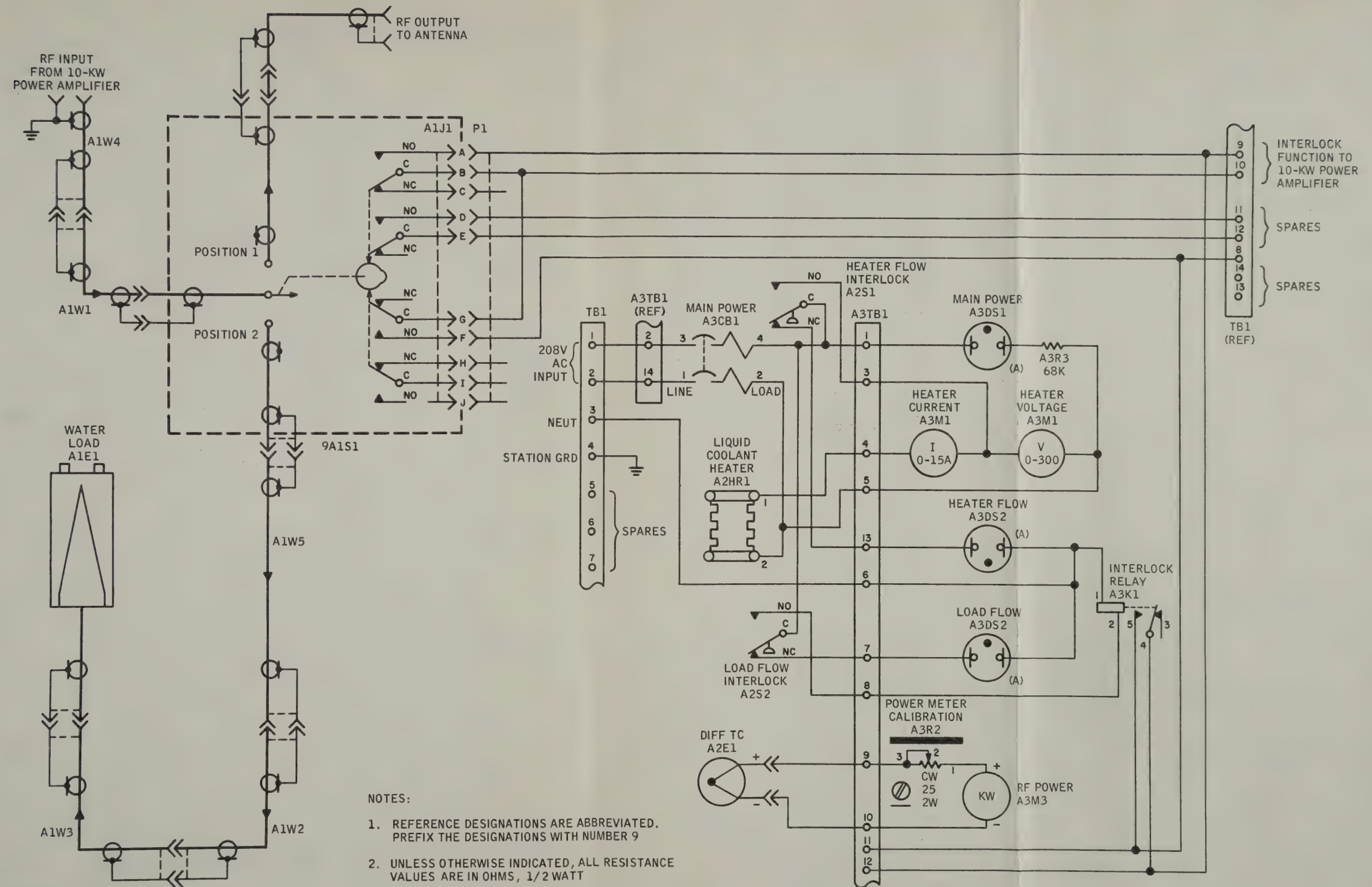
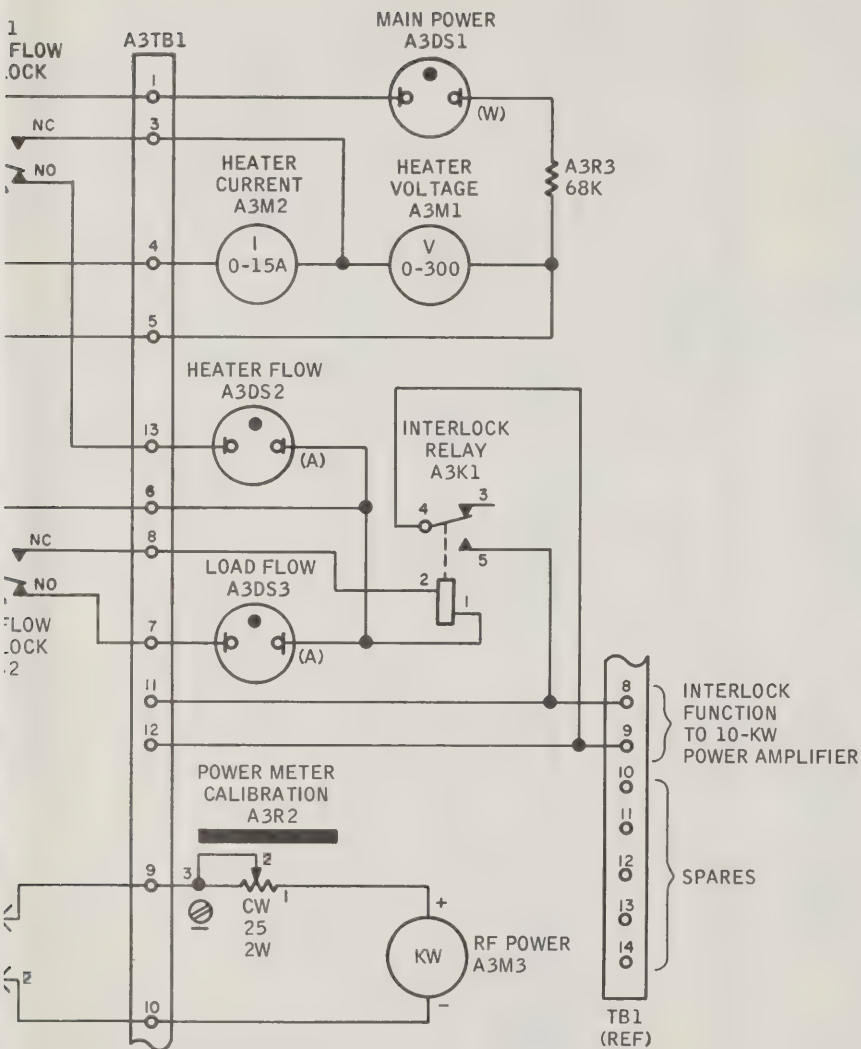


Figure 6-1. Dummy Load A or B Schematic Diagram



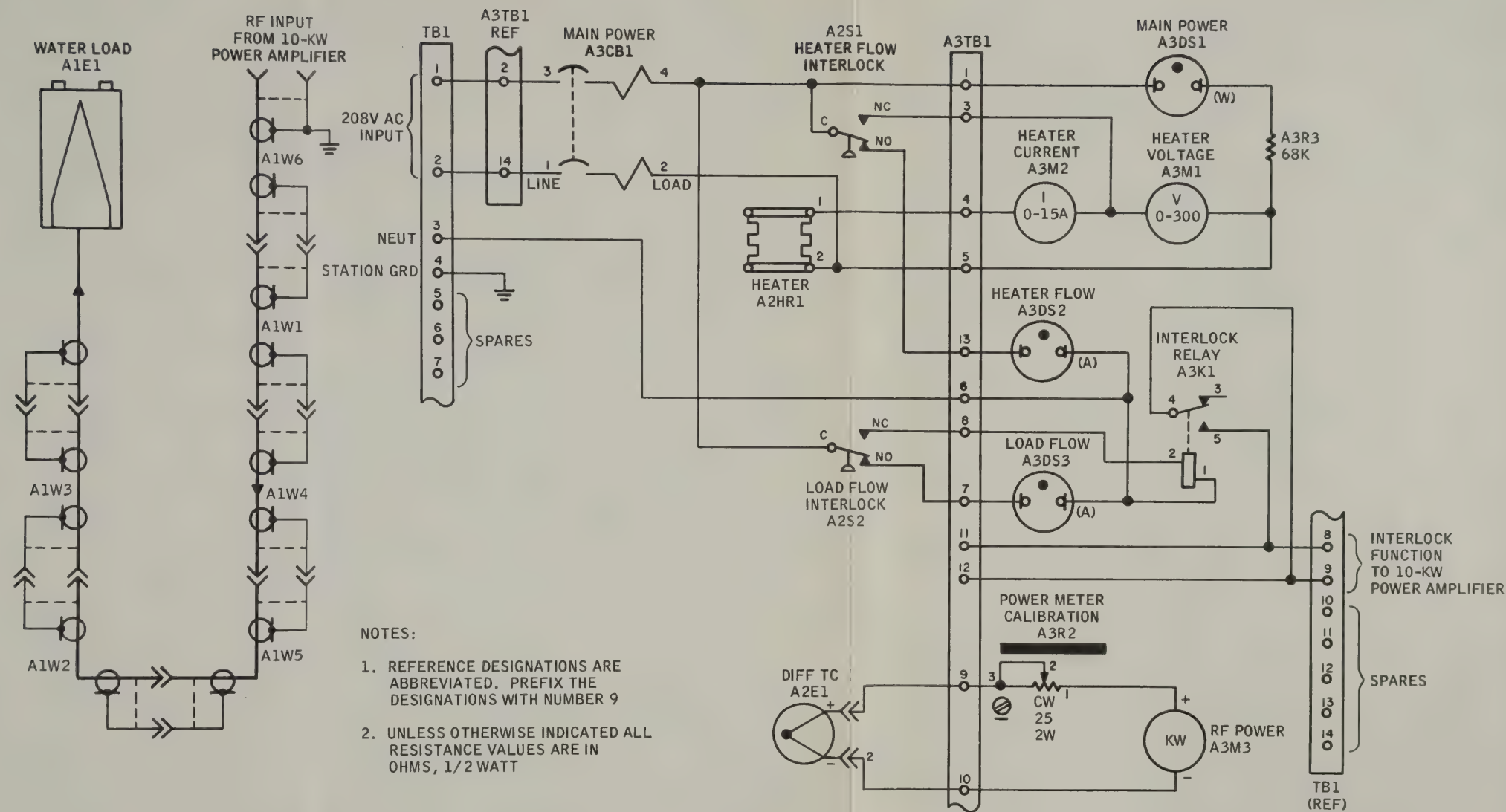


Figure 6-2. Dummy Load C or D Schematic Diagram

